YAMAHA

2009

SERVICE MANUAL

FJR13AY(C)
FJR13AEY(C)

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FJR13AY(C)/FJR13AEY(C)
SERVICE MANUAL

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EAS20071

IMPORTANT

This manual was produced by the Yamaha Motor Company, Ltd. primarily for use by Yamaha dealers and their qualified mechanics. It is not possible to include all the knowledge of a mechanic in one manual. Therefore, anyone who uses this book to perform maintenance and repairs on Yamaha vehicles should have a basic understanding of mechanics and the techniques to repair these types of vehicles. Repair and maintenance work attempted by anyone without this knowledge is likely to render the vehicle unsafe and unfit for use.
This model has been designed and manufactured to perform within certain specifications in regard to performance and emissions. Proper service with the correct tools is necessary to ensure that the vehicle will operate as designed. If there is any question about a service procedure, it is imperative that you contact a Yamaha dealer for any service information changes that apply to this model. This policy is intended to provide the customer with the most satisfaction from his vehicle and to conform to federal environmental quality objectives.
Yamaha Motor Company, Ltd. is continually striving to improve all of its models. Modifications and significant changes in specifications or procedures will be forwarded to all authorized Yamaha dealers and will appear in future editions of this manual where applicable.

TIP

- This Service Manual contains information regarding periodic maintenance to the emission control system. Please read this material carefully.
- Designs and specifications are subject to change without notice.

EAS20081

IMPORTANT MANUAL INFORMATION

Particularly important information is distinguished in this manual by the following notations.

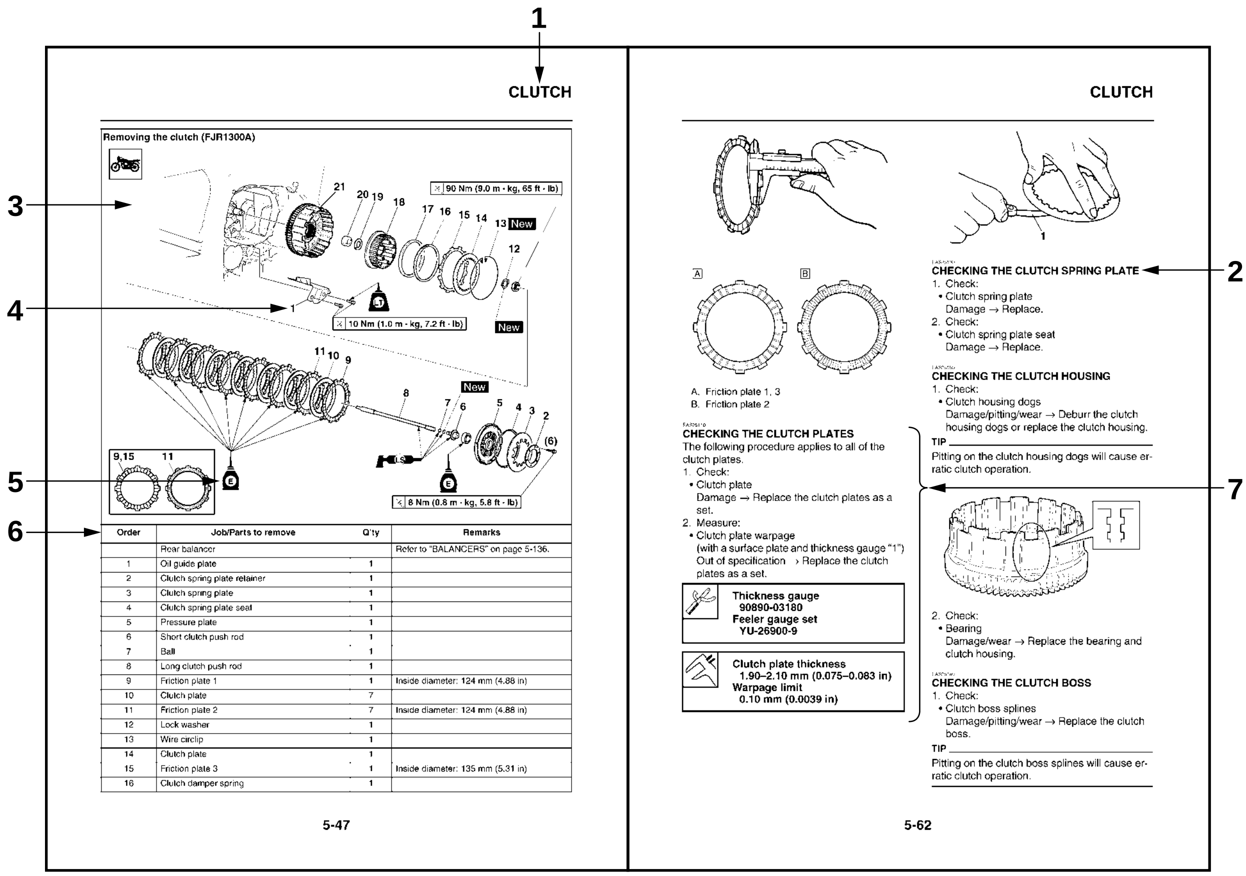
⚠	**This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.**
⚠ WARNING	**A WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.**
NOTICE	**A NOTICE indicates special precautions that must be taken to avoid damage to the vehicle or other property.**
TIP	A TIP provides key information to make procedures easier or clearer.

EAS20090

HOW TO USE THIS MANUAL

This manual is intended as a handy, easy-to-read reference book for the mechanic. Comprehensive explanations of all installation, removal, disassembly, assembly, repair and check procedures are laid out with the individual steps in sequential order.

- The manual is divided into chapters and each chapter is divided into sections. The current section title "1" is shown at the top of each page.
- Sub-section titles "2" appear in smaller print than the section title.
- To help identify parts and clarify procedure steps, there are exploded diagrams "3" at the start of each removal and disassembly section.
- Numbers "4" are given in the order of the jobs in the exploded diagram. A number indicates a disassembly step.
- Symbols "5" indicate parts to be lubricated or replaced.
  Refer to "SYMBOLS".
- A job instruction chart "6" accompanies the exploded diagram, providing the order of jobs, names of parts, notes in jobs, etc.
- Jobs "7" requiring more information (such as special tools and technical data) are described sequentially.



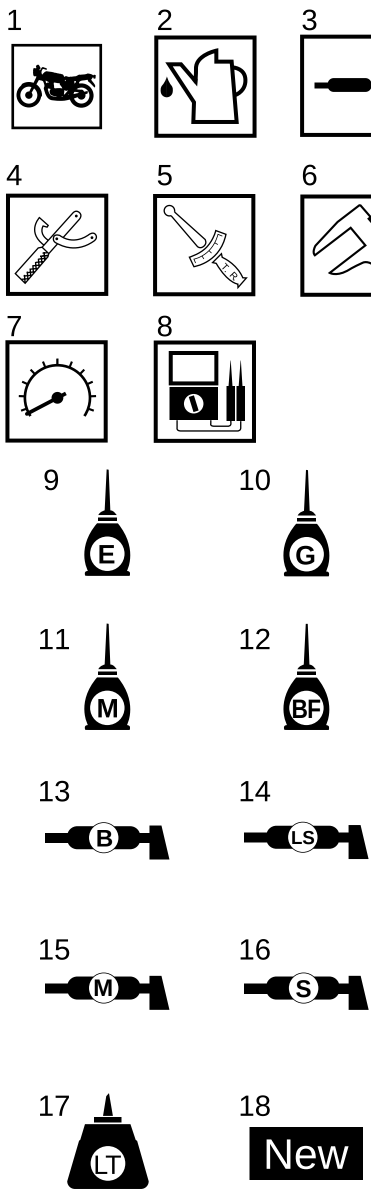
EAS20100

SYMBOLS

The following symbols are used in this manual for easier understanding.

TIP

The following symbols are not relevant to every vehicle.



1. Serviceable with engine mounted
2. Filling fluid
3. Lubricant
4. Special tool
5. Tightening torque
6. Wear limit, clearance
7. Engine speed
8. Electrical data
9. Engine oil
10. Gear oil
11. Molybdenum disulfide oil
12. Brake fluid
13. Wheel bearing grease
14. Lithium-soap-based grease
15. Molybdenum disulfide grease
16. Silicone grease
17. Apply locking agent (LOCTITE®).
18. Replace the part with a new one.

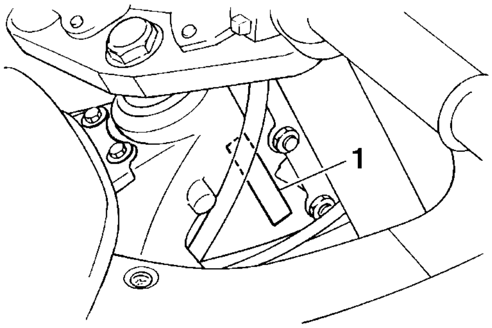
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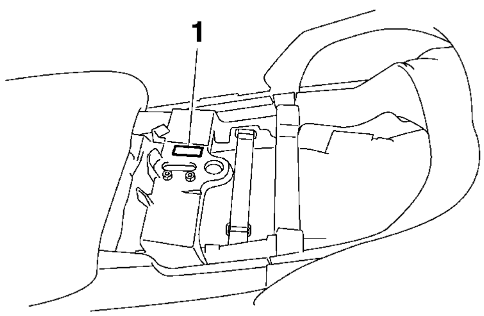
GENERAL INFORMATION

EAS20130
IDENTIFICATION

EAS20140
VEHICLE IDENTIFICATION NUMBER
The vehicle identification number “1” is stamped into the right side of the steering head pipe.



EAS20150
MODEL LABEL
The model label “1” is affixed to the frame. This information will be needed to order spare parts.



EAS20170
FEATURES

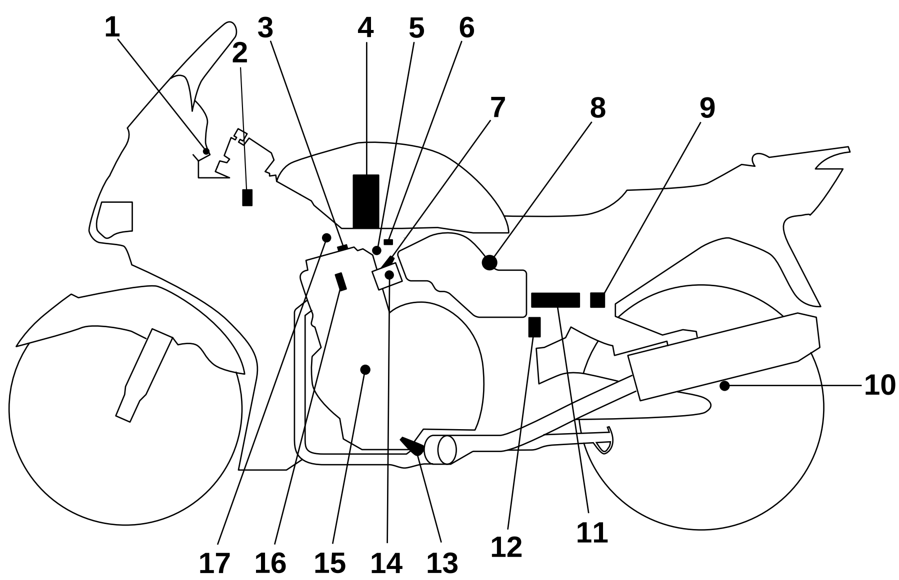
ET2C01025
OUTLINE OF THE FI SYSTEM

The main function of a fuel supply system is to provide fuel to the combustion chamber at the optimum air-fuel ratio in accordance with the engine operating conditions and the atmospheric temperature. In the conventional carburetor system, the air-fuel ratio of the mixture that is supplied to the combustion chamber is created by the volume of the intake air and the fuel that is metered by the jet used in the respective carburetor.

Despite the same volume of intake air, the fuel volume requirement varies by the engine operating conditions, such as acceleration, deceleration, or operating under a heavy load. Carburetors that meter the fuel through the use of jets have been provided with various auxiliary devices, so that an optimum air-fuel ratio can be achieved to accommodate the constant changes in the operating conditions of the engine.

As the requirements for the engine to deliver more performance and cleaner exhaust gases increase, it becomes necessary to control the air-fuel ratio in a more precise and finely tuned manner. To accommodate this need, this model has adopted an electronically controlled fuel injection (FI) system, in place of the conventional carburetor system. This system can achieve an optimum air-fuel ratio required by the engine at all times by using a microprocessor that regulates the fuel injection volume according to the engine operating conditions detected by various sensors.

The adoption of the FI system has resulted in a highly precise fuel supply, improved engine response, better fuel economy, and reduced exhaust emissions. Furthermore, the air induction system (AI system) has been placed under computer control together with the FI system in order to realize cleaner exhaust gases.

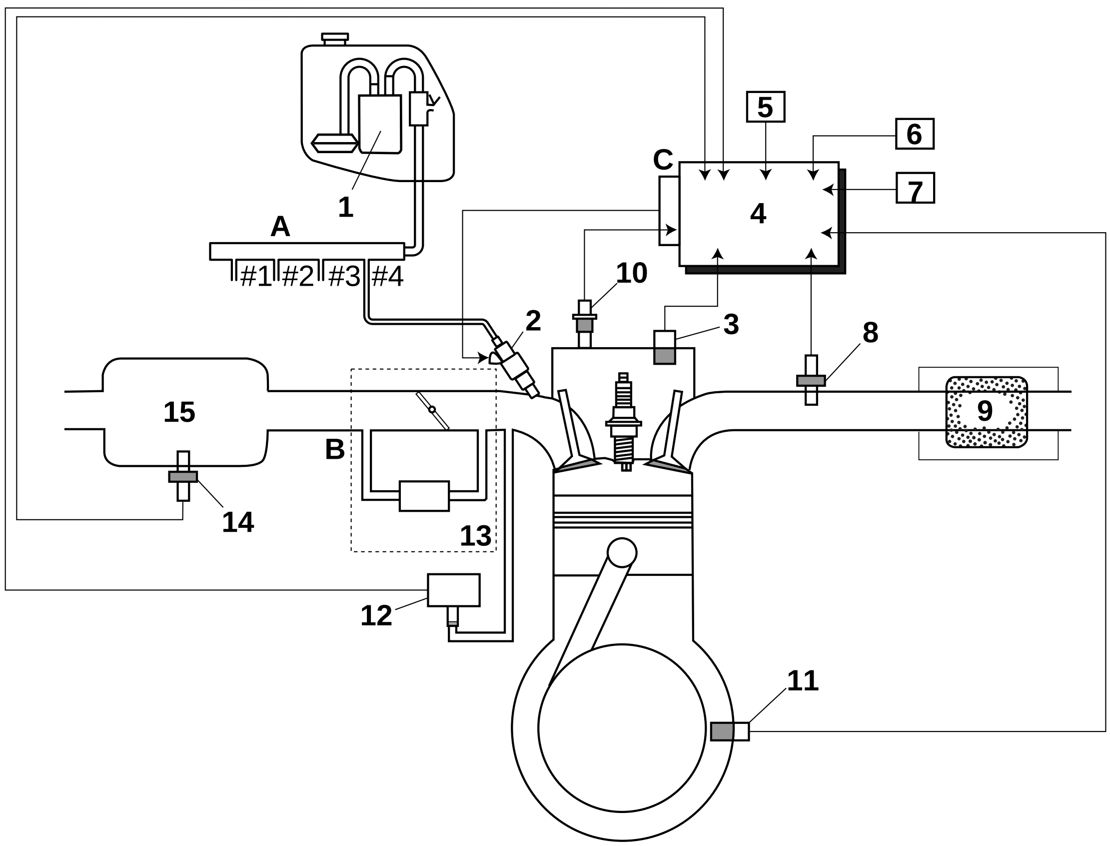


1. Engine trouble warning light
2. Ignition coil
3. Cylinder identification sensor
4. Fuel pump
5. Air induction system solenoid
6. Intake air pressure sensor
7. Injector
8. Intake air temperature sensor
9. Lean angle sensor
10. Rear wheel sensor
11. ECU (engine control unit)
12. Relay unit (fuel pump relay)
13. O_2 sensor
14. Throttle position sensor
15. Crankshaft position sensor
16. Spark plug
17. Coolant temperature sensor

ET3P61042

FI SYSTEM

The fuel pump delivers fuel to the fuel injector via the fuel filter. The pressure regulator maintains the fuel pressure that is applied to the fuel injector at only 324 kPa (3.24 kg/cm², 47.0 psi). Accordingly, when the energizing signal from the ECU energizes the fuel injector, the fuel passage opens, causing the fuel to be injected into the intake manifold only during the time the passage remains open. Therefore, the longer the length of time the fuel injector is energized (injection duration), the greater the volume of fuel that is supplied. Conversely, the shorter the length of time the fuel injector is energized (injection duration), the lesser the volume of fuel that is supplied.
The injection duration and the injection timing are controlled by the ECU. Signals that are input from the throttle position sensor, coolant temperature sensor, cylinder identification sensor, lean angle sensor, crankshaft position sensor, intake air pressure sensor, intake air temperature sensor, rear wheel sensor and O_2 sensor enable the ECU to determine the injection duration. The injection timing is determined through the signals from the crankshaft position sensor. As a result, the volume of fuel that is required by the engine can be supplied at all times in accordance with the driving conditions.



1. Fuel pump
2. Injector
3. Cylinder identification sensor
4. ECU (engine control unit)
5. Throttle position sensor
6. Rear wheel sensor
7. Lean angle sensor
8. O_2 sensor
9. Catalytic converter
10. Coolant temperature sensor
11. Crankshaft position sensor
12. Intake air pressure sensor
13. Throttle body
14. Intake air temperature sensor
15. Air filter case

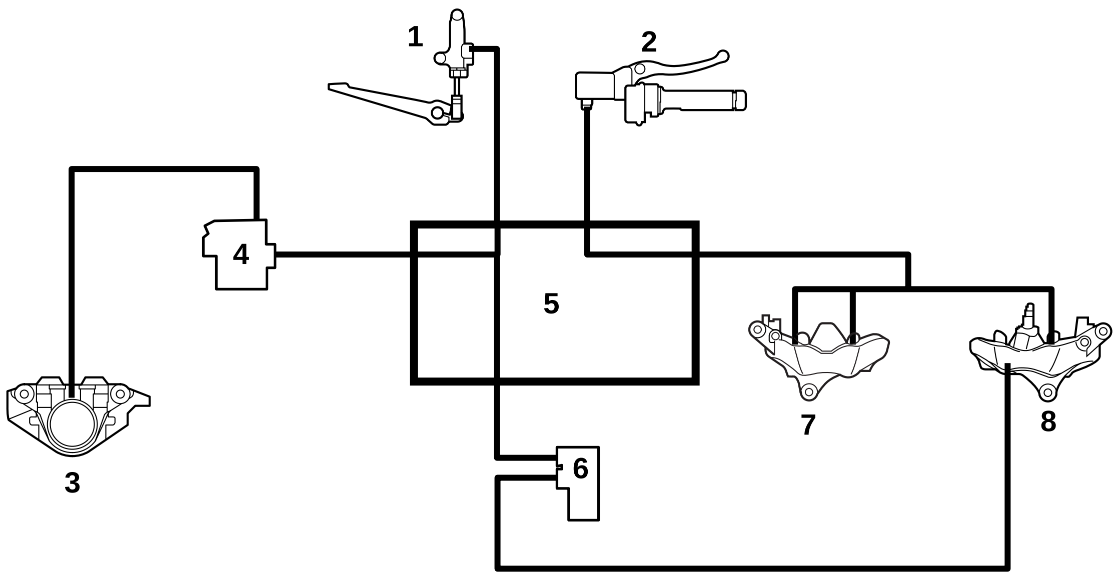
A. Fuel system
B. Air system
C. Control system

ET3P61050

OUTLINE OF THE UNIFIED BRAKE SYSTEM

The Yamaha unified brake system is a system that operates one set of pistons in the front brakes together with the rear brake when the brake pedal is depressed. Compared to conventional brake systems, the ability to slow the vehicle using the simple operation of the brake pedal is improved.

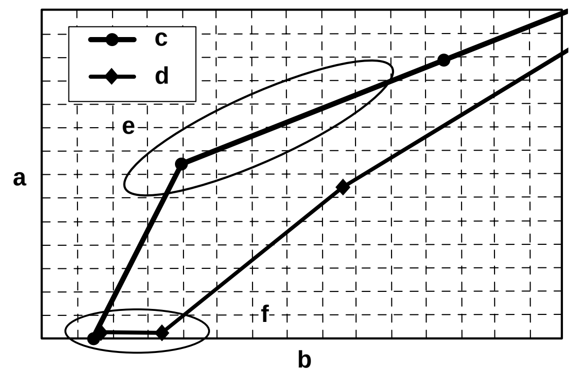
Unified brake system block diagram



1. Rear brake master cylinder
2. Front brake master cylinder
3. Rear brake caliper
4. Proportioning valve
5. Hydraulic unit assembly (ABS ECU)
6. Metering valve
7. Left front brake caliper
8. Right front brake caliper

When the brake lever is squeezed, both sets of pistons in the left front brake caliper are operated, but only one set of pistons in the right front brake caliper is operated. When the brake pedal is depressed, the rear brake caliper and one set of pistons in the right front brake caliper are operated. The brake line from the rear brake master cylinder is split at the hydraulic unit to transmit brake fluid pressure to both the rear brake caliper and part of the right front brake caliper in the unified brake system. The brake fluid pressure transmitted to the rear brake caliper and part of the right front brake caliper is controlled by the proportioning valve and metering valve respectively. The operation of these two valves ensures that the braking feeling of conventional brakes is maintained when a small amount of force is applied to the brake pedal, such as when making U-turns, and prevents early locking of the rear wheel when a large amount of force is applied.

Brake pedal input force and braking force at each wheel



a. Brake force
b. Brake pedal force
c. Rear brake force
d. Front brake force (unified brake system)
e. Proportioning valve operation
f. Metering valve operation

Metering valve

This valve prevents the brake fluid pressure that is transmitted to the right front brake caliper from increasing until the pressure exceeds a set level. Only the rear brake caliper is operated when there is an extremely low amount of brake pedal input.

Proportioning valve

This valve reduces the increase in brake fluid pressure that is transmitted to the rear brake caliper when the pressure exceeds a set level. The increase in brake fluid pressure to the rear brake caliper is controlled when there is a high amount of brake pedal input.

EC3P61017

NOTICE

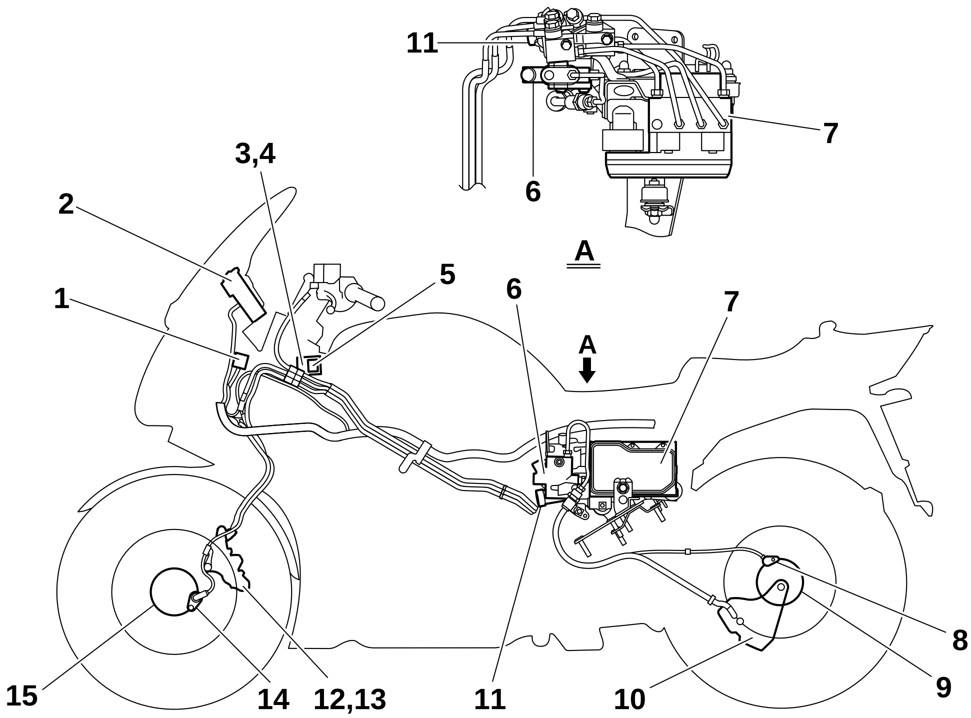
- **The unified brake system is a system to assist the brake operation. However, both the brake lever and the brake pedal must be operated for maximum braking effect.**
- **Because the balance between the right front brake caliper and the rear brake caliper in the unified brake system is determined mechanically, be sure to use the specified brake pads.**
- **Each set of brake pads should be checked individually and replaced if necessary.**

ET3P61019

OUTLINE OF THE ABS

1. The Yamaha ABS (anti-lock brake system) features an electronic control system, which acts on the front and rear brakes independently. However, one set of pistons in the right front brake caliper is operated together with the rear brake and this set of pistons is operated only if the force used to depress the brake pedal exceeds a preset level.
2. The ABS features a compact and lightweight design to help maintain the basic maneuverability of the vehicle.
3. The hydraulic unit assembly, which is the main component of the ABS, is centrally located on the vehicle to increase mass centralization.

ABS layout



1. ABS test coupler
2. ABS warning light
3. ABS ECU fuse
4. ABS solenoid fuse
5. ABS motor fuse
6. Proportioning valve
7. Hydraulic unit assembly (ABS ECU)
8. Rear wheel sensor
9. Rear wheel sensor rotor
10. Rear brake caliper
11. Metering valve
12. Left front brake caliper
13. Right front brake caliper (partially operated together with the rear brake)
14. Front wheel sensor
15. Front wheel sensor rotor

ABS

The operation of the Yamaha ABS brakes is the same as conventional brakes on other vehicles, with a brake lever for operating the front brake and a brake pedal for operating the rear brake. However, part of the front brake is operated together with rear brake.

When wheel lock is detected during emergency braking, hydraulic control is performed by the hydraulic system on the front and rear brakes independently.

Useful terms

- Wheel speed:
  The rotation speed of the front and rear wheels.
- Chassis speed:
  The speed of the chassis.
  When the brakes are applied, wheel speed and chassis speed are reduced. However, the chassis travels forward by its inertia even though the wheel speed is reduced.
- Brake force:
  The force applied by braking to reduce the wheel speed.
- Wheel lock:
  A condition that occurs when the rotation of one or both of the wheels has stopped, but the vehicle continues to travel.
- Side force:
  The force on the tires which supports the vehicle when cornering.

- Slip ratio:
  When the brakes are applied, slipping occurs between the tires and the road surface. This causes a difference between the wheel speed and the chassis speed.
  Slip ratio is the value that shows the rate of wheel slippage and is defined by the following formula.

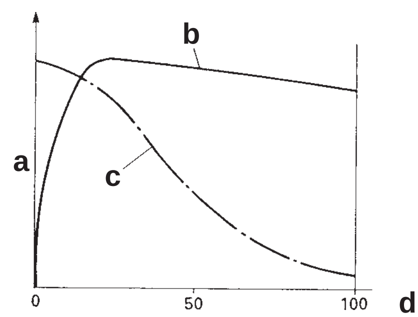
$$\text{Slip ratio} = \frac{\text{Chassis speed} - \text{Wheel speed}}{\text{Chassis speed}} \times 100\ (\%)$$

  0%: There is no slipping between the wheel and the road surface. The chassis speed is equal to the wheel speed.
  100%: The wheel speed is “0”, but the chassis is moving (i.e., wheel lock).

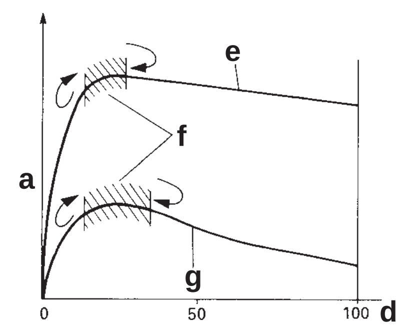
Brake force and vehicle stability

When the brake pressure is increased, wheel speed is reduced. Slipping occurs between the tire and the road surface and brake force is generated. The limit of this brake force is determined by the friction force between the tire and the road surface and is closely related to wheel slippage. Wheel slippage is represented by the slip ratio.
Side force is also closely related to wheel slippage. See figure “A”. If the brakes are applied while keeping the proper slip ratio, it is possible to obtain the maximum brake force without losing much side force. ABS allows full use of the tires’ capabilities even on slippery road surfaces or less slippery road surfaces. See figure “B”.

A



B

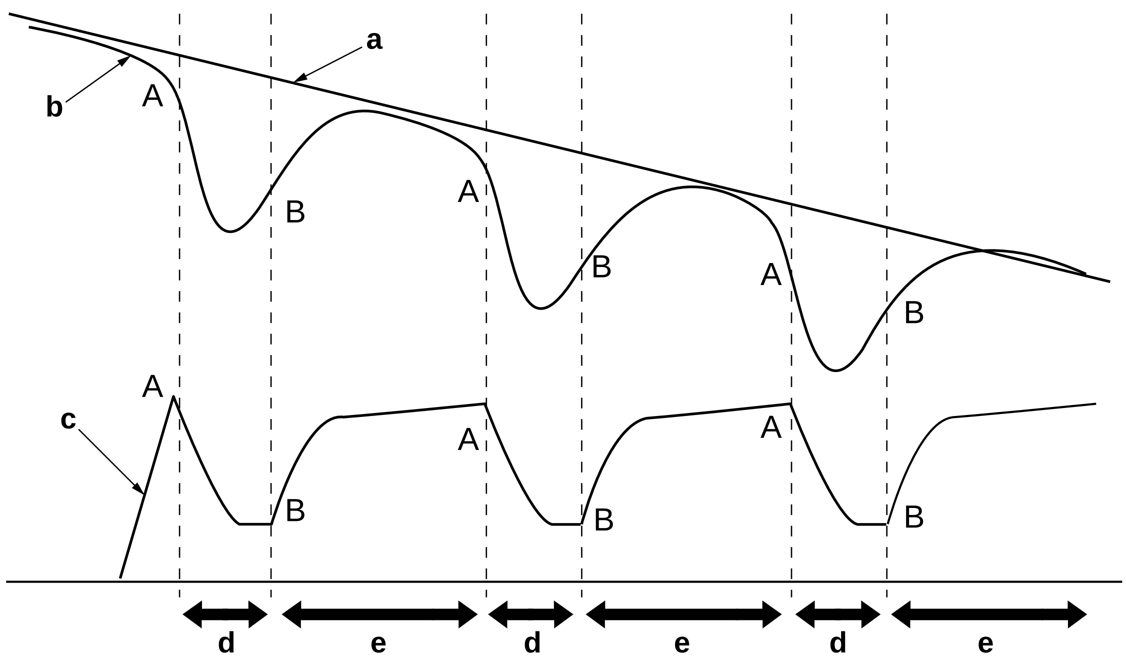


a. Friction force between the tire and road surface
b. Brake force
c. Side force
d. Slip ratio (%)
e. Less slippery road surface
f. Controlling zone
g. Slippery road surface

Wheel slip and hydraulic control

The ABS ECU calculates the wheel speed of each wheel according to the rotation signal received from the front and rear wheel sensors. In addition, the ABS ECU calculates the vehicle chassis speed and the rate of speed reduction based on the wheel speed values.

The difference between the chassis speed and the wheel speed calculated in the slip ratio formula is equal to the wheel slip. When the wheel speed is suddenly reduced, the wheel has a tendency to lock. When the wheel slip and the wheel speed reduction rate exceed the preset values, the ABS ECU determines that the wheel has a tendency to lock.
If the slip is large and the wheel has a tendency to lock (point A in the following figure), the ABS ECU reduces the brake fluid pressure in the brake caliper. Once the ABS ECU determines that the tendency of the wheel to lock has diminished after the brake fluid pressure is reduced, it increases the hydraulic pressure (point B in the following figure). The hydraulic pressure is initially increased quickly, and then it is increased gradually.



a. Chassis speed
b. Wheel speed
c. Brake force
d. Depressurizing phase
e. Pressurizing phase

ABS operation and vehicle control

If the ABS starts operating, there is a tendency of the wheel to lock, and the vehicle is approaching the limit of control. To make the rider aware of this condition, the ABS has been designed to generate a reaction-force pulsating action in the brake lever and brake pedal independently.

TIP

When the ABS is activated, a pulsating action may be felt at the brake lever or brake pedal, but this does not indicate a malfunction.

The higher the side force on a tire, the less traction there is available for braking. This is true whether the vehicle is equipped with ABS or not. Therefore, sudden braking while cornering is not recommended. Excessive side force, which ABS cannot prevent, could cause the tire to slip sideways.

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WARNING

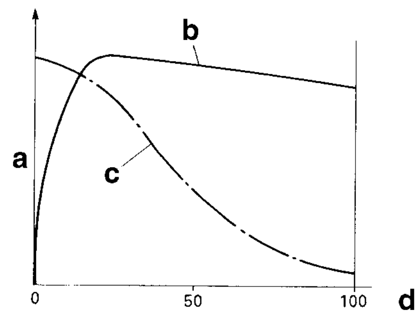
The braking of the vehicle, even in the worst case, is principally executed when the vehicle is advancing straight ahead. During a turn, sudden braking is liable to cause a loss of traction of the tires. Even in vehicles equipped with ABS, overturning of the vehicle cannot be prevented if it is braked suddenly.

The ABS functions to prevent the tendency of the wheel to lock by controlling the brake fluid pressure. However, if there is a tendency of the wheel to lock on a slippery road surface, due to engine braking, the ABS may not be able to prevent the wheel from locking.

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WARNING

The ABS controls only the tendency of the wheel to lock caused by applying the brakes. The ABS cannot prevent wheel lock on slippery surfaces, such as ice, when it is caused by engine braking, even if the ABS is operating.

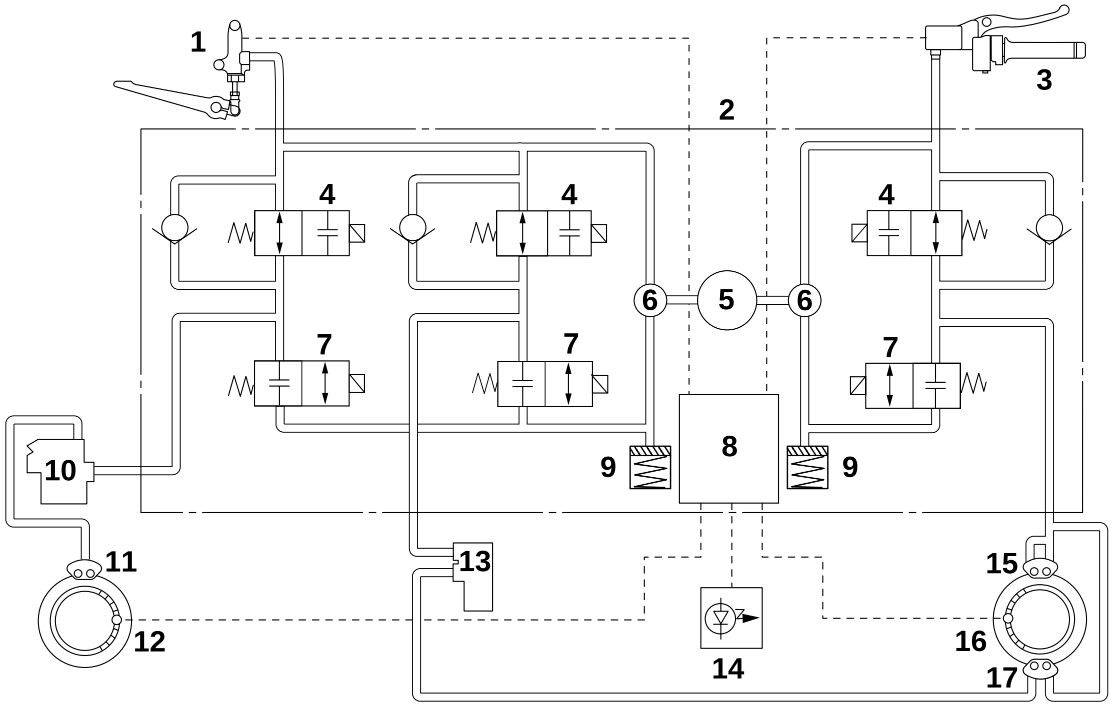


a. Friction force between the tire and road surface
b. Brake force
c. Side force
d. Slip ratio (%)

Electronic ABS features

The Yamaha ABS (anti-lock brake system) has been developed with the most advanced electronic technology.
The ABS control is processed with good response under various vehicle travel conditions.
The ABS also includes a highly developed self-diagnosis function. The ABS detects any problem condition and allows normal braking even if the ABS is not operating properly.
When this occurs, the ABS warning light on the meter assembly comes on.
The ABS stores the fault codes in the memory of the ABS ECU for easy problem identification and troubleshooting.

ABS block diagram



1. Rear brake master cylinder
2. Hydraulic unit assembly
3. Front brake master cylinder
4. Inlet solenoid valve
5. ABS motor
6. Hydraulic pump
7. Outlet solenoid valve
8. ABS ECU
9. Buffer chamber
10. Proportioning valve
11. Rear brake caliper
12. Rear wheel sensor
13. Metering valve
14. ABS warning light
15. Left front brake caliper
16. Front wheel sensor
17. Right front brake caliper

ET3P61051

ABS COMPONENT FUNCTIONS

Wheel sensors and wheel sensor rotors

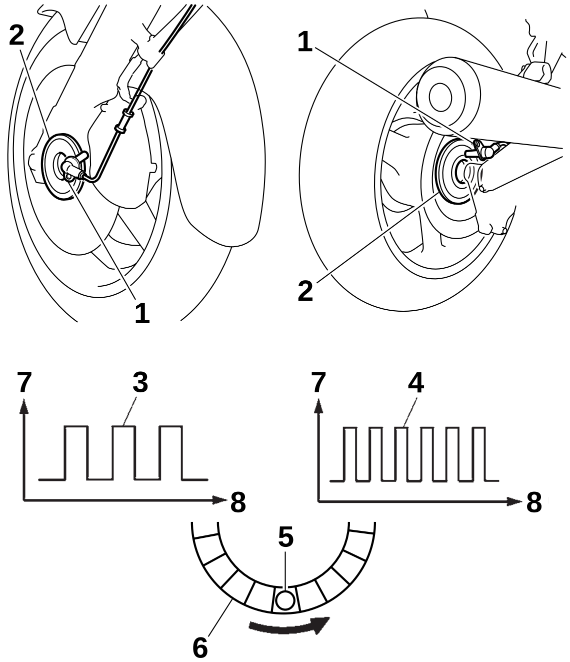
Wheel sensors "1" detect the wheel rotation speed and transmit the wheel rotation signal to the ABS ECU.

Each wheel sensor contains a Hall IC. The wheel sensors are installed in the sensor housing for each wheel.

Sensor rotors "2" are installed on the inner side of the front and rear wheel hubs and rotate with the wheels.

The front and rear sensor rotors each have 84 magnetic poles (42 pairs) and are installed close to the wheel sensors. As the sensor rotor rotates, the Hall element in the Hall IC installed in the wheel sensor generates pulses. The pulse frequency, which is proportional to the magnetic flux density, is converted into a wave in the Hall IC so that it can be output.

The ABS ECU calculates the wheel rotation speed by detecting the pulse frequency.



3. At low speed
4. At high speed
5. Wheel sensor
6. Wheel sensor rotor
7. Voltage
8. Time

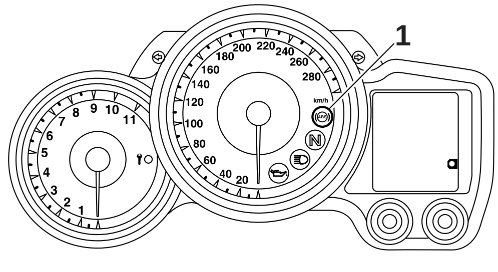
ABS warning light

The ABS warning light “1” comes on to warn the rider if a malfunction in the ABS occurs.
When the main switch is turned to “ON”, the ABS warning light comes on for 2 seconds, then goes off, so that the rider can check if the ABS warning light is disconnected and check if the ABS is operating properly.

EC3P61009

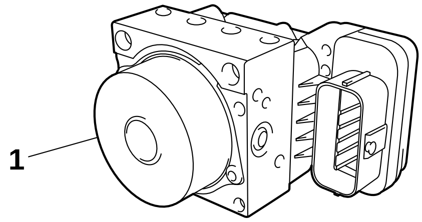
NOTICE

If the rear wheel is raced with the vehicle on the centerstand, the ABS warning light may flash or come on. If this occurs, turn the main switch to “OFF”, then back to “ON”. The ABS operation is normal if the ABS warning light comes on for 2 seconds, then goes off.



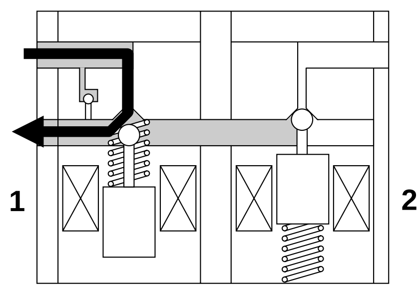
Hydraulic unit assembly

The hydraulic unit assembly “1” is composed of hydraulic control valves (each with a outlet solenoid valve and inlet solenoid valve), buffer chambers, hydraulic pumps, an ABS motor, and ABS ECU. The hydraulic unit adjusts the front and rear wheel brake fluid pressure to control the wheel speed according to signals transmitted from the ABS ECU.

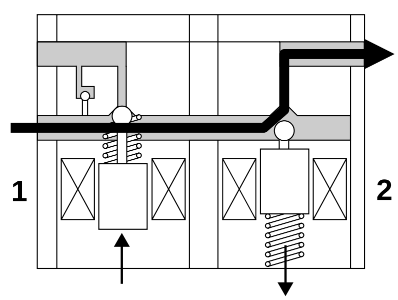


• **Hydraulic control valve**
The hydraulic control valve is composed of a inlet solenoid valve and outlet solenoid valve.
The electromagnetic force generated in the inlet solenoid valve varies proportionally with the duty cycle control voltage that is supplied to it. Since this voltage is continuously variable, the solenoid valve moves smoothly and the hydraulic pressure is adjusted linearly.

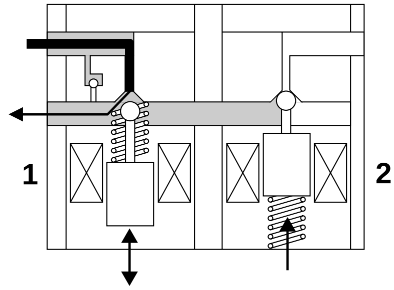
1. When the brakes are operated normally, the inlet solenoid valve “1” is open and the outlet solenoid valve “2” is closed. The brake line between the brake master cylinder and brake caliper is open.



2. When the ABS is activated, the inlet solenoid valve “1” closes and the outlet solenoid valve “2” opens using the power supplied from the ABS ECU signals. This reduces the hydraulic pressure.

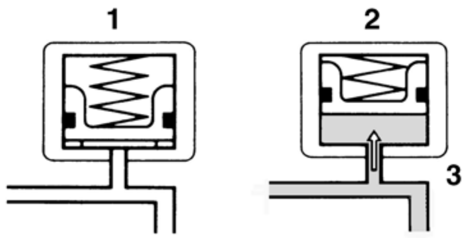


3. When the ABS ECU sends a signal to stop reducing the hydraulic pressure, the outlet solenoid valve “2” closes and the brake fluid is pressurized again. The inlet solenoid valve “1” controls the hydraulic pressure difference between the brake fluid in the upper brake lines (brake master cylinder side) and the brake fluid in the lower brake lines (brake caliper side).



• **Buffer chamber**

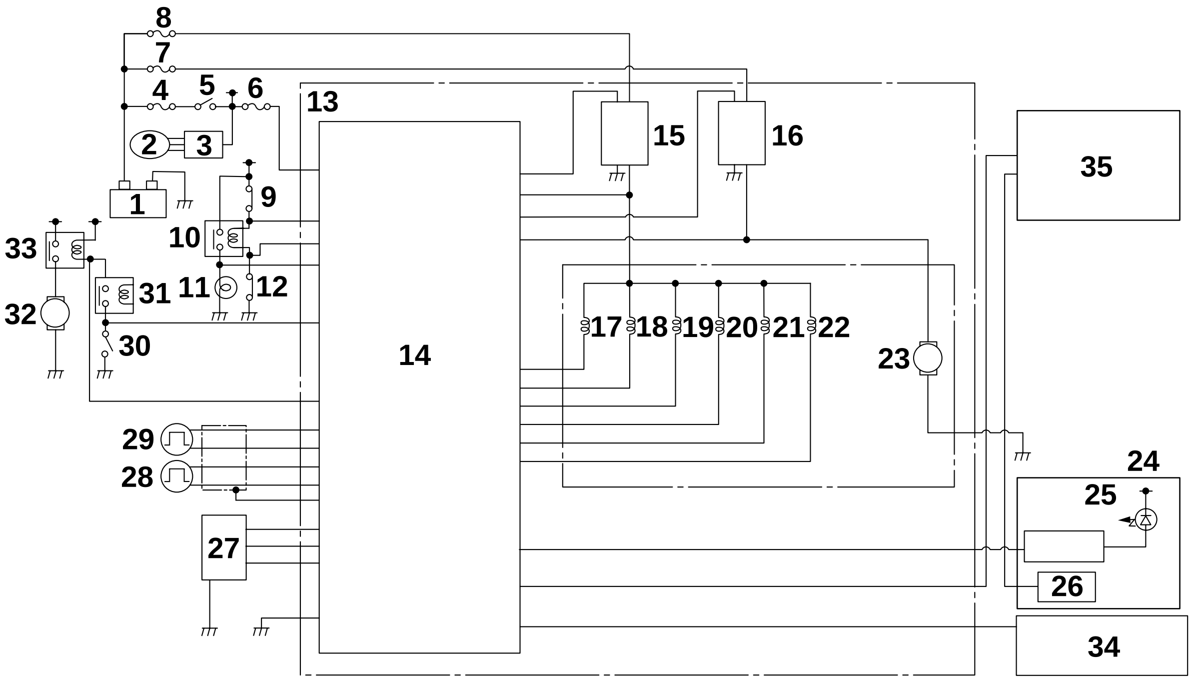
The buffer chamber accumulates the brake fluid that is depressurized while the ABS is operating.



1. Buffer chamber (pressurizing phase)
2. Buffer chamber (depressurizing phase)
3. Raised piston

- **ABS ECU**

  The ABS ECU is integrated with the hydraulic unit to achieve a compact and lightweight design.
  As shown in the block following diagram, the ABS ECU receives wheel sensor signals from the front and rear wheels and also receives signals from other monitor circuits.



1. Battery
2. AC magneto
3. Rectifier/regulator
4. Main fuse
5. Main switch
6. ABS ECU fuse
7. ABS motor fuse
8. ABS solenoid fuse
9. Front brake light switch
10. Brake light relay
11. Tail/brake light
12. Rear brake light switch
13. Hydraulic unit assembly
14. ABS ECU
15. Solenoid relay
16. ABS motor relay
17. Front brake inlet solenoid
18. Front brake outlet solenoid
19. Rear brake inlet solenoid
20. Rear brake outlet solenoid
21. Unified brake system inlet solenoid
22. Unified brake system outlet solenoid
23. ABS motor
24. Meter assembly
25. ABS warning light
26. Speedometer
27. ABS test coupler
28. Rear wheel sensor
29. Front wheel sensor
30. Start switch
31. Starting circuit cut-off relay
32. Starter motor
33. Starter relay
34. MCU (motor control unit) (FJR13AE only)
35. ECU (engine control unit)

The necessary actions are confirmed using the monitor circuit and control signals are transmitted to the hydraulic unit assembly.

ABS control operation

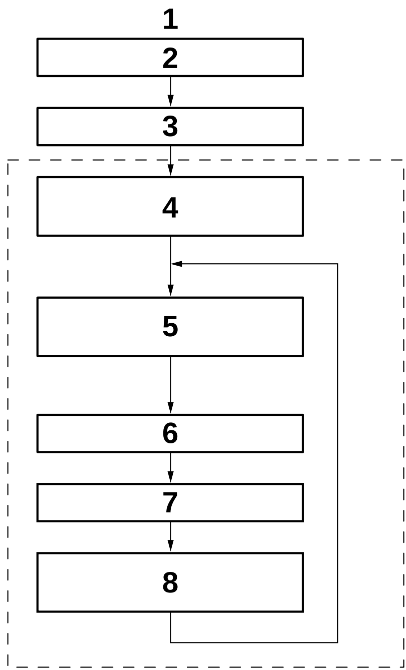
The ABS control operation performed in the ABS ECU is divided into the following two parts.

- Hydraulic control
- Self-diagnosis

When a malfunction is detected in the ABS, a fault code is stored in the memory of the ABS ECU for easy problem identification and troubleshooting.

TIP

- Some types of malfunctions are not recorded in the memory of the ABS ECU (e.g., a blown ABS ECU fuse).
- The ABS performs a self-diagnosis test for a few seconds each time the vehicle first starts off after the main switch was turned on. During this test, a “clicking” noise can be heard from under the seat, and if the brake lever or brake pedal are even slightly applied, a vibration can be felt at the lever and pedal, but these do not indicate a malfunction.



1. Software operation flow
2. Main switch “ON”
3. Initialize
4. Self-diagnosis (when static)
5. Self-diagnosis (when riding)
6. Receive signals
7. Control operation
8. Depressurize/pressurize

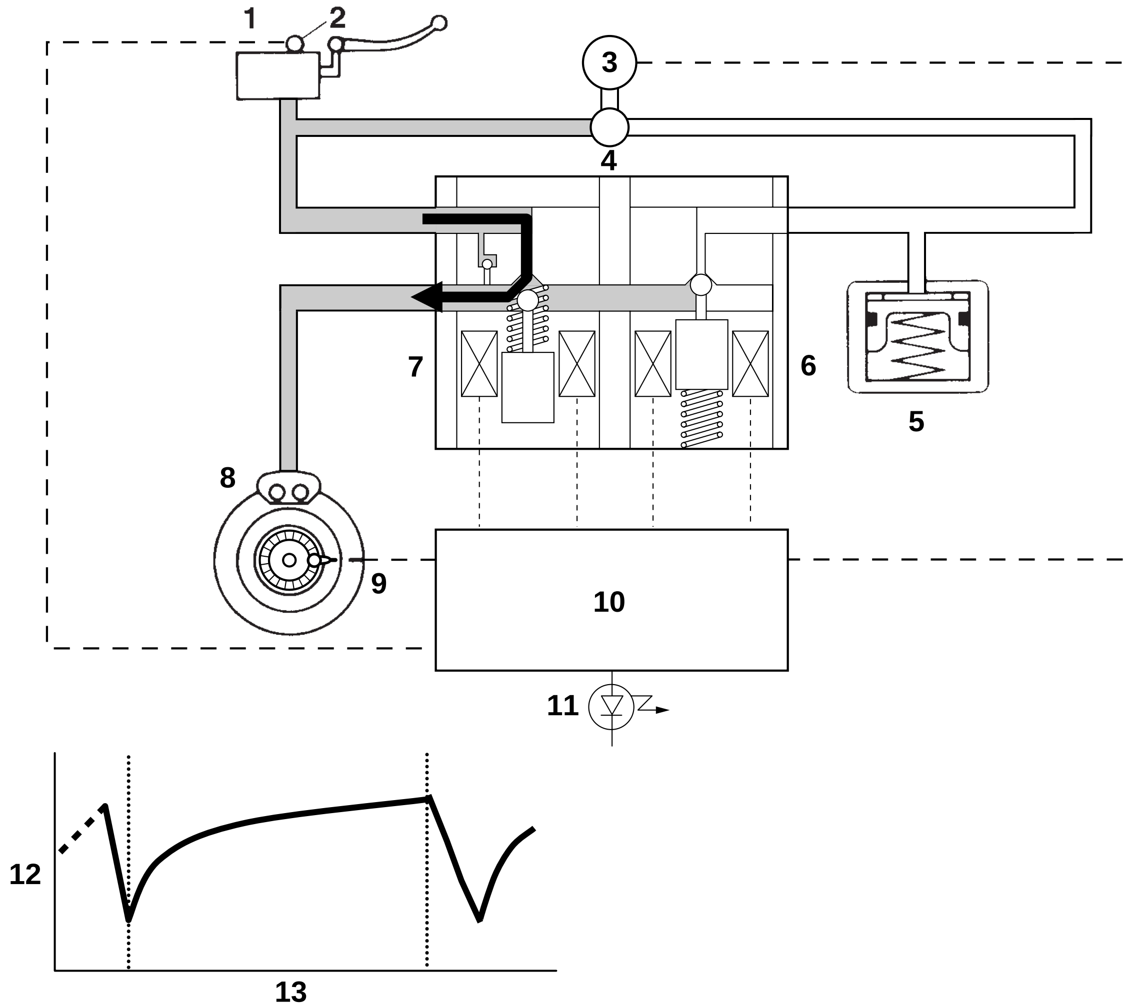
ET3P61052

ABS OPERATION

The ABS hydraulic circuit consists of two systems: the front wheel, and rear wheel. The following describes the system for the front wheel only, excluding the unified brake system.

Normal braking (ABS not activated)

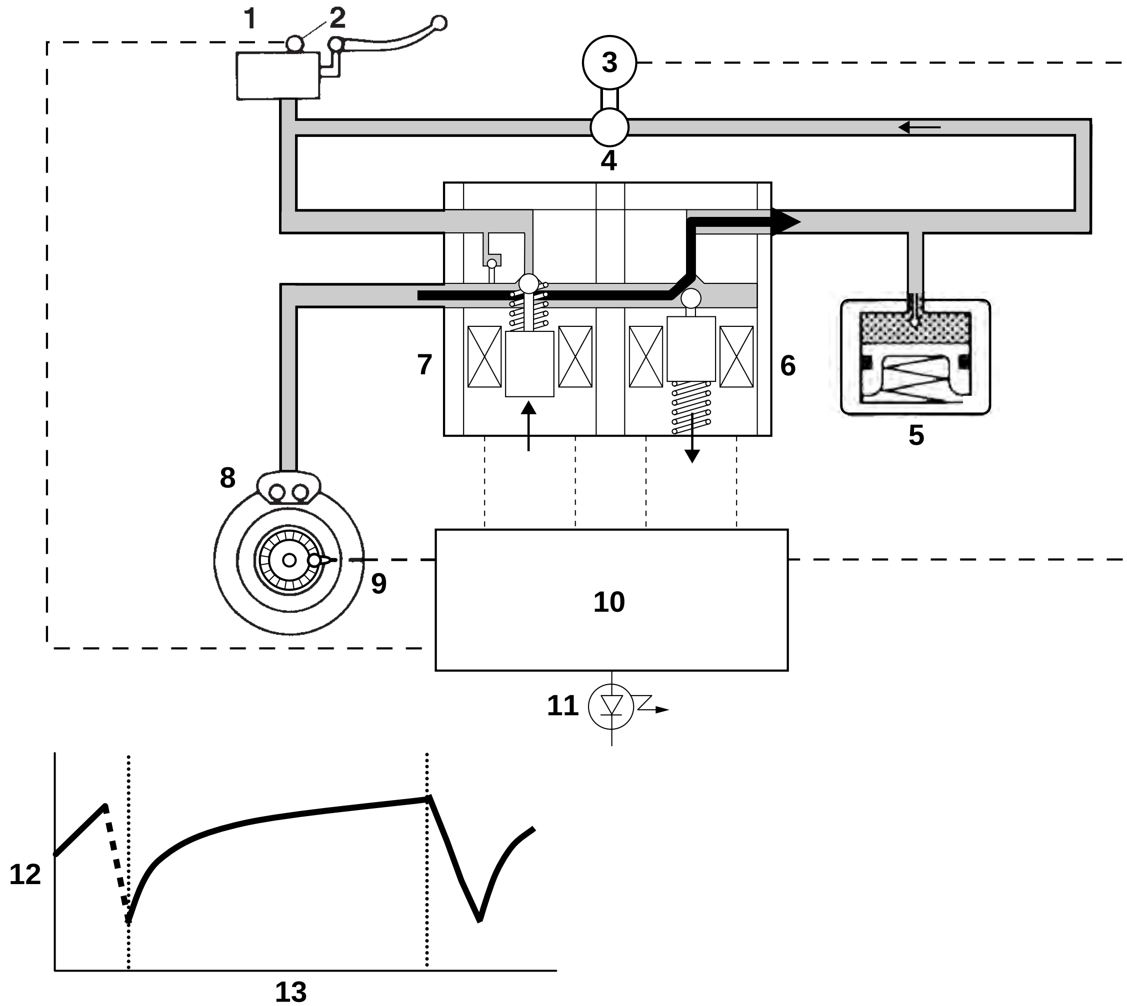
When the ABS is not activated, the inlet solenoid valve is open and the outlet solenoid valve is closed because a control signal has not been transmitted from the ABS ECU. Therefore, when the brake lever is squeezed, the hydraulic pressure in the brake master cylinder increases and the brake fluid is sent to the brake caliper.
At this time, the inlet and outlet check valves of the hydraulic pump are closed. As a result of eliminating the orifice, the brake master cylinder directly pressurizes the brake caliper during normal braking. When the brake lever is released, the brake fluid in the brake caliper returns to the brake master cylinder.



1. Brake master cylinder
2. Brake light switch
3. ABS motor
4. Hydraulic pump
5. Buffer chamber
6. Outlet solenoid valve
7. Inlet solenoid valve
8. Brake caliper
9. Wheel sensor
10. ABS ECU
11. ABS warning light
12. Brake fluid pressure
13. Time

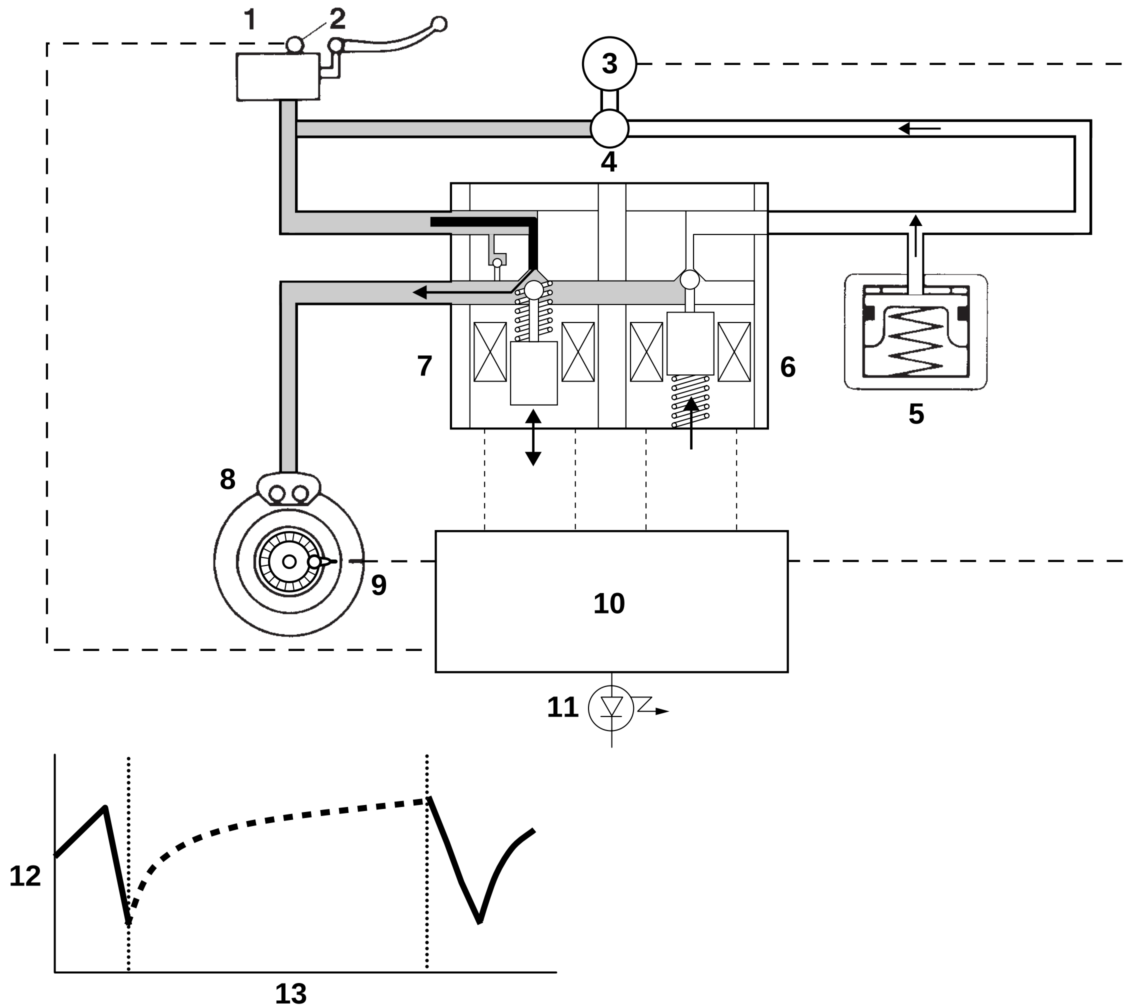
Emergency braking (ABS activated)

1. Depressurizing phase
   When the front wheel is about to lock, the outlet solenoid valve is opened by the “depressurization” signal transmitted from the ABS ECU. When this occurs, the inlet solenoid valve compresses the spring and closes the brake line from the brake master cylinder. Because the outlet solenoid valve is open, the brake fluid is sent to the buffer chamber. As a result, the hydraulic pressure in the brake caliper is reduced.
   The brake fluid stored in the buffer chamber is pumped back to the brake master cylinder by the hydraulic pump linked to the ABS motor.



1. Brake master cylinder
2. Brake light switch
3. ABS motor
4. Hydraulic pump
5. Buffer chamber
6. Outlet solenoid valve
7. Inlet solenoid valve
8. Brake caliper
9. Wheel sensor
10. ABS ECU
11. ABS warning light
12. Brake fluid pressure
13. Time

2. Pressurizing phase
   The outlet solenoid valve is closed by the “pressurization” signal transmitted from the ABS ECU. At this time, the ABS ECU controls the opening of the inlet solenoid valve. As the inlet solenoid valve opens, the brake line from the brake master cylinder opens, allowing the brake fluid to be sent to the brake caliper.



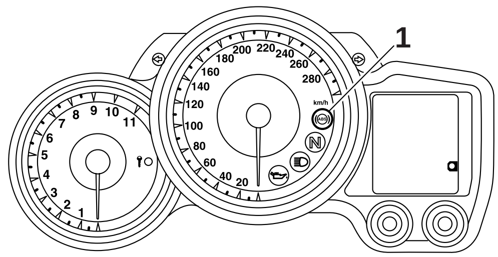
1. Brake master cylinder
2. Brake light switch
3. ABS motor
4. Hydraulic pump
5. Buffer chamber
6. Outlet solenoid valve
7. Inlet solenoid valve
8. Brake caliper
9. Wheel sensor
10. ABS ECU
11. ABS warning light
12. Brake fluid pressure
13. Time

ET3P61053

ABS SELF-DIAGNOSIS FUNCTION

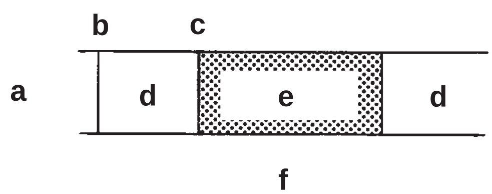
ABS warning light

The ABS warning light “1” comes on when a malfunction is detected by the ABS self-diagnosis. It is located in the meter assembly.



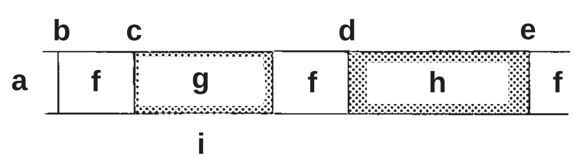
Instances when the ABS warning light comes on

1. The ABS warning light comes on when the main switch is turned to “ON”.
   The ABS warning light comes on for 2 seconds while the ABS is performing a self-diagnosis, then goes off if there are no problems.



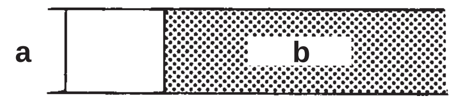
a. ABS warning light
b. Main switch “OFF”
c. Main switch “ON”
d. Goes off
e. Comes on for 2 seconds
f. ABS self-diagnosis

2. The ABS warning light comes on while the start switch is being pushed.
   When the engine is being started, the ABS warning light comes on while the start switch is being pushed. (Refer to “ELECTRIC STARTING SYSTEM” on page 8-13.)



a. ABS warning light
b. Main switch “OFF”
c. Main switch “ON”
d. Start switch “ON”
e. Start switch “OFF”
f. Goes off
g. Comes on for 2 seconds
h. Comes on while the start switch is being pushed
i. ABS self-diagnosis

3. The ABS warning light comes on while riding.
   If the ABS warning light comes on while riding, a malfunction has been detected in the ABS. The ABS hydraulic control will not be performed. The ABS will have recourse to manual braking if this occurs.

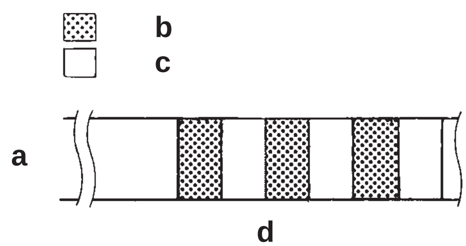


a. ABS warning light
b. Comes on

4. The ABS warning light flashes while riding.
   If the ABS warning light flashes while riding, there is no problem with the function of the ABS. However, the ABS ECU input has unstable factors. (For details, refer to “ABS TROUBLESHOOTING OUTLINE” on page 8-131.)

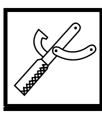
TIP

The ABS warning light comes on or flashes if the vehicle is ridden with the test coupler adapter connected to the ABS test coupler.



a. ABS warning light
b. Comes on
c. Goes off
d. Unstable ABS ECU input

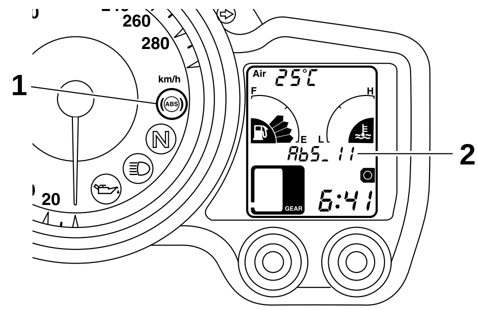
5. The ABS warning light “1” flashes and a fault code “2” is indicated on the multi-function display when the test coupler adapter “3” is connected to the ABS test coupler “4” for troubleshooting the ABS.
   The ABS test coupler can be accessed by removing front cowling right inner panel 1.
   When the test coupler adapter is connected to the ABS test coupler, the ABS warning light starts flashing and the multi-function display indicates all the fault codes recorded in the ABS ECU.

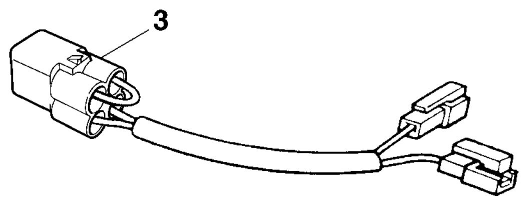


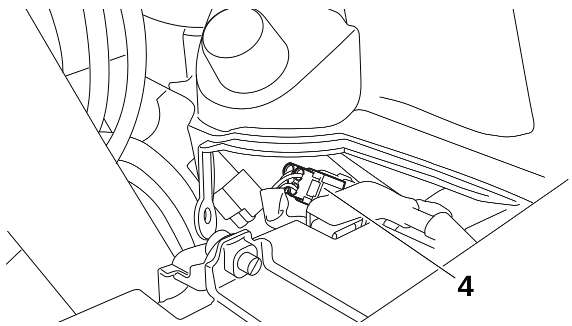
Test coupler adapter
90890-03149

TIP

The ABS warning light comes on or flashes if the vehicle is ridden with the test coupler adapter connected to the ABS test coupler.







ET3P61054

ABS WARNING LIGHT AND OPERATION

ABS warning light

- When the main switch is turned to “ON”, the ABS warning light comes on for 2 seconds, then goes off.
- The ABS warning light comes on while the start switch is being pushed.
- If the ABS warning light comes on while riding, stop the vehicle, and then turn the main switch to “OFF”, then back to “ON”. The ABS operation is normal if the ABS warning light comes on for 2 seconds, then goes off.
- If the rear wheel is raced with the vehicle on the centerstand, the ABS warning light may flash or come on. If this occurs, turn the main switch to “OFF”, then back to “ON”. The ABS operation is normal if the ABS warning light comes on for 2 seconds, then goes off.
- The ABS operation is normal if the ABS warning light flashes.
- Even if the ABS warning light remains on and does not go off, or if it comes on after riding, conventional braking performance of the vehicle is maintained.

ABS function

- When hydraulic control is performed by the ABS, the brake system alerts the rider that the wheels have a tendency to lock by generating a reaction-force pulsating action in the brake lever or brake pedal. When the ABS is activated, the grip between the road surface and tires is close to the limit. The ABS cannot prevent wheel lock* on slippery surfaces, such as ice, when it is caused by engine braking, even if the ABS is activated.
- The ABS is not designed to shorten the braking distance or improve the cornering performance.

- Depending on the road conditions, the braking distance may be longer compared to that of vehicles not equipped with ABS. Therefore, ride at a safe speed and keep a safe distance between yourself and other vehicles.
- The braking of the vehicle, even in the worst case, is principally executed when the vehicle is advancing straight ahead. During a turn, sudden braking is liable to cause a loss of traction of the tires. Even vehicles equipped with ABS cannot be prevented from falling over if braked suddenly.
- The ABS does not work when the main switch is turned to “OFF”. The conventional braking function can be used.

* Wheel lock: A condition that occurs when the rotation of one or both of the wheels has stopped, but the vehicle continues to travel.

ET3P66049

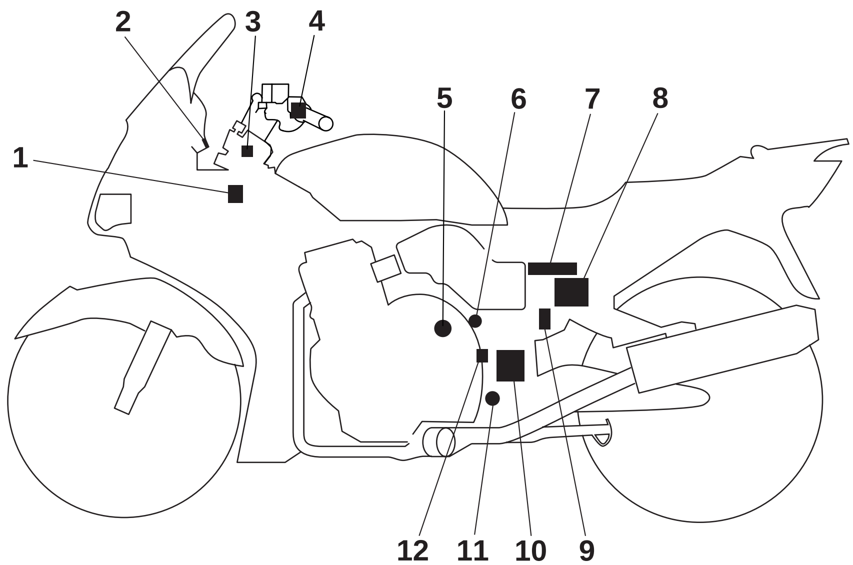
OUTLINE OF THE YCC-S (Yamaha Chip Controlled-Shift) SYSTEM (FJR13AE)

Concept

YCC-S offers more enjoyable and easy riding by eliminating the need for the user to operate the clutch, which also reduces fatigue during long touring.
YCC-S is not an automatic transmission, although it allows the user to shift gears by foot or hand according to preference.
When shifting, a signal is sent to the MCU (motor control unit), which ensures optimum clutch operation, shifting, and engine control. Therefore, the user never needs to operate the clutch, which in turn, reduces fatigue and allows the user to concentrate while riding.
When stopping at traffic lights or in traffic jams, YCC-S operates the clutch instead of the user.

Basic function

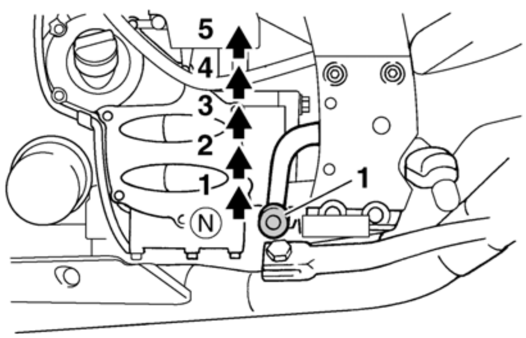
To shift gears after starting the engine, the user must use the shift pedal. However, depending on the user’s preference, the transmission can be shifted by hand after setting the hand shift select button to “ON”.
When the engine is started, the MCU disengages the clutch. A signal is sent to the MCU when the transmission is shifted from neutral to 1st gear by hand or foot. When the throttle is opened, the MCU then engages the clutch according to engine r/min. Clutch engagement is controlled optimally by the MCU. Clutch engagement is not constant in order to provide smooth shifting according to engine requirements and conditions.
The YCC-S system will not shift up if the engine r/min is lower than a specified value. Even if the user shifts up, if the specified value is not met (engine r/min is too low), the YCC-S system will not shift up until the above-mentioned specified value is met.
Likewise, the YCC-S system will not shift down if the specified value is not met (engine r/min is too high).
In this case, the throttle must be closed so that the MCU can disengage the clutch until the specified value is met to prevent the engine from stopping. During this period, a coasting condition will be felt.
The user must shift down properly in order for the YCC-S system to provide a smooth stopping condition.
The YCC-S system is constantly performing a self-diagnosis when the engine is running. If any trouble is detected, the MCU automatically stops the YCC-S system and shifting is impossible.

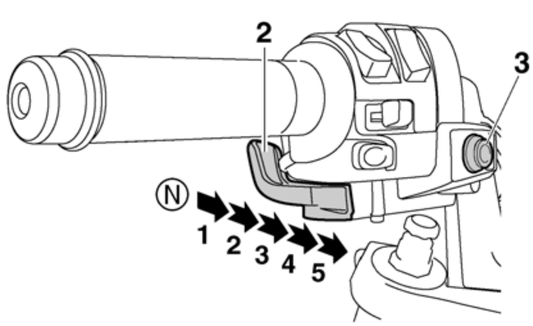


1. YCC-S test coupler
2. YCC-S indicator and warning light
3. YCC-S motor control fuse
4. Hand shift switch
5. Gear position sensor
6. Neutral switch
7. MCU (motor control unit)
8. Shift actuator
9. YCC-S control relay
10. Clutch actuator
11. Foot shift switch
12. YCC-S speed sensor

Shift pattern

This vehicle is equipped with a constant-mesh 5-speed transmission. The gears can be shifted using either the shift pedal "1" or the hand shift switch "2". The hand shift switch has to be enabled by pressing the hand shift select button "3" prior to being used. The gear positions are shown in the illustration.



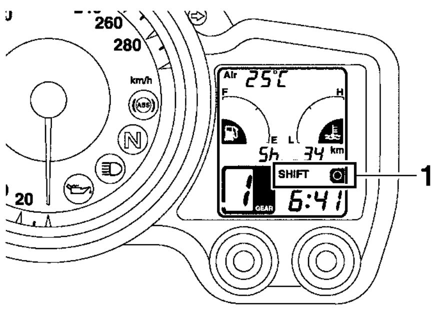


Attention

- Do not turn the main switch to “OFF” while the vehicle is moving, otherwise the electrical systems will be switched off, including the YCC-S system, which may result in loss of control or an accident. Make sure that the vehicle is stopped before turning the main switch to “OFF”.
- The clutch will be engaged for a few seconds after the engine is stopped using the main switch if the transmission is not in neutral. This means that the vehicle cannot be moved by pushing or pulling it. To move the vehicle, turn the main switch to “ON”, and then apply the front or rear brake to disengage the clutch. A click will be heard when the clutch is disengaged.
- Always stop the engine and turn the main switch to “LOCK” when parking the vehicle.

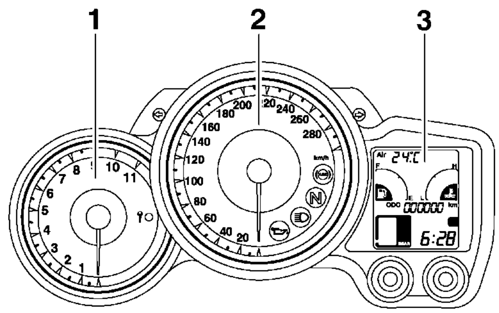
YCC-S indicator and warning light

- The YCC-S system is constantly performing a self-diagnosis.
- The YCC-S system also performs a self-diagnosis when the main switch is turned to “ON”. The YCC-S indicator and warning light “1” come on during this self-diagnosis. After the self-diagnosis is completed, if there were no problems found, the YCC-S indicator and warning light will go off.
- If the YCC-S indicator and warning light come on while riding, stop the vehicle, park it in a safe place, and then contact a Yamaha dealer.
  Because the YCC-S system stops automatically when the YCC-S indicator and warning light come on, it is impossible to shift since clutch operation is stopped. To move the vehicle, turn the main switch to “OFF” and place the vehicle on the centerstand. While rotating the rear wheel, push the shift rod forward and shift the transmission into neutral.



ET3P61043
INSTRUMENT FUNCTIONS

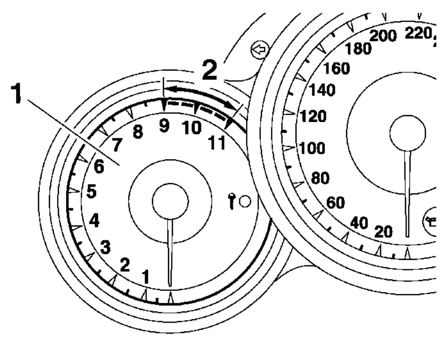
Speedometer



1. Tachometer
2. Speedometer
3. Multi-function display

The speedometer shows the riding speed. When the key is turned to “ON”, the speedometer needle will sweep once across the speed range and then return to zero in order to test the electrical circuit.

Tachometer



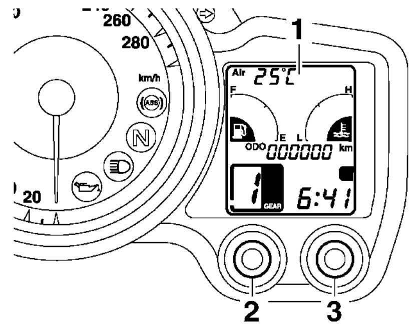
1. Tachometer
2. Tachometer red zone

The electric tachometer allows the rider to monitor the engine speed and keep it within the ideal power range.
When the key is turned to “ON”, the tachometer needle will sweep once across the r/min range and then return to zero r/min in order to test the electrical circuit.

EC3P61039
NOTICE

Do not operate the engine in the tachometer red zone.
Red zone: 9000 r/min and above

Multi-function display



1. Multi-function display
2. “SELECT” button
3. “RESET” button

EW3P61020
WARNING

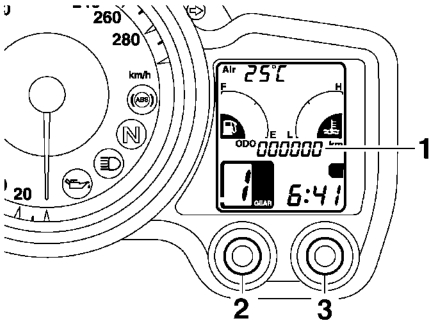
Be sure to stop the vehicle before making any setting changes to the multi-function display.

The multi-function display is equipped with the following:
- an odometer (which shows the total distance traveled)
- two tripmeters (which show the distance traveled since they were last set to zero)
- a fuel reserve tripmeter (which shows the distance traveled on the fuel reserve)
- a clock
- a fuel meter
- a coolant temperature meter
- a transmission gear display
- an ambient temperature display
- a fuel consumption display (instantaneous and average consumption functions)
- a self-diagnosis device

TIP

Be sure to turn the key to “ON” before using the “SELECT” and “RESET” buttons.

Odometer and tripmeter modes



1. Odometer/tripmeter/fuel reserve tripmeter
2. "SELECT" button
3. "RESET" button

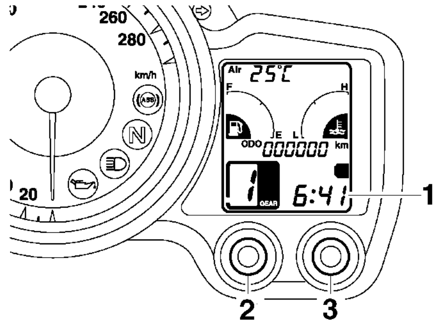
Pushing the "SELECT" button switches the display between the odometer mode "ODO" and the tripmeter modes "TRIP 1" and "TRIP 2" in the following order:
ODO → TRIP 1 → TRIP 2 → ODO

TIP

When selecting "TRIP 1" or "TRIP 2", the display flashes for five seconds.

When approximately 5.5 L (1.45 US gal) (1.21 Imp.gal) of fuel remains in the fuel tank, the display will automatically change to the fuel reserve tripmeter mode "F-TRIP" and start counting the distance traveled from that point. In that case, pushing the "SELECT" button switches the display between the various tripmeter and odometer modes in the following order:
F-TRIP → ODO → TRIP 1 → TRIP 2 → F-TRIP
To reset a tripmeter, select it by pushing the "SELECT" button, and then push the "SELECT" button for at least one second while the display is flashing. If you do not reset the fuel reserve tripmeter manually, it will reset itself automatically and the display will return to the prior mode after refueling and traveling 5 km (3 mi).

Clock

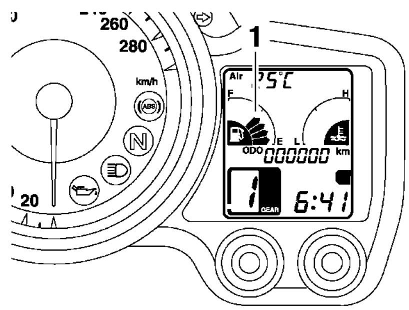


1. Clock
2. "SELECT" button
3. "RESET" button

To set the clock:

1. Push the "SELECT" button and "RESET" button together for at least two seconds.
2. When the hour digits start flashing, push the "RESET" button to set the hours.
3. Push the "SELECT" button, and the minute digits will start flashing.
4. Push the "RESET" button to set the minutes.
5. Push the "SELECT" button and then release it to start the clock.

Fuel meter



1. Fuel meter

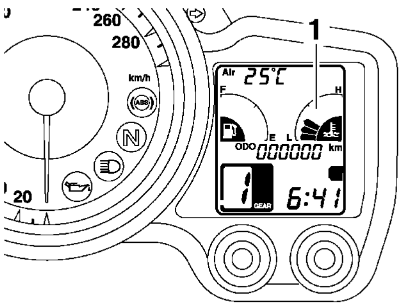
The fuel meter indicates the amount of fuel in the fuel tank. The display segments of the fuel meter disappear towards "E" (Empty) as the fuel level decreases. When the last segment starts flashing, refuel as soon as possible. When the key is turned to "ON", all of the display segments of the fuel meter will appear one after the other and then disappear in order to test the electrical circuit.

TIP

This fuel meter is equipped with a self-diagnosis system. If the electrical circuit is defective, all the display segments will start flashing. If this occurs, check the electrical circuit.

Refer to “SIGNALING SYSTEM” on page 8-39.

Coolant temperature meter



1. Coolant temperature meter

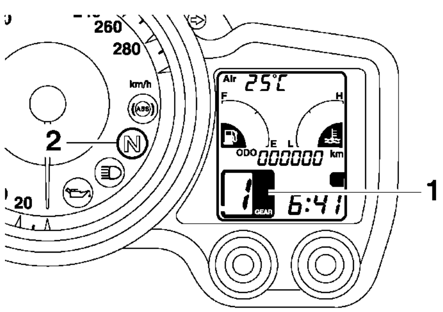
With the key in the “ON” position, the coolant temperature meter indicates the temperature of the coolant. When the key is turned to “ON”, all of the display segments of the coolant temperature meter will appear one after the other and then disappear in order to test the electrical circuit. The coolant temperature varies with changes in the weather and engine load. If the top segment flashes, stop the vehicle and let the engine cool.

EC3P61040

NOTICE

Do not operate the engine if it is overheated.

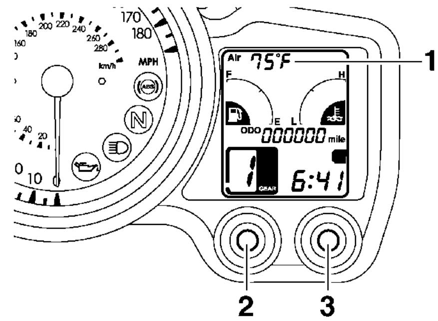
Transmission gear display



1. Transmission gear display
2. Neutral indicator light “ **N** ”

This display shows the selected gear. The neutral position, however, is not displayed, it is indicated by the neutral indicator light.
To avoid damaging the YCC-S clutch, the display flashes when it is necessary to downshift. If this occurs, downshift until the display stops flashing. (FJR13AE)

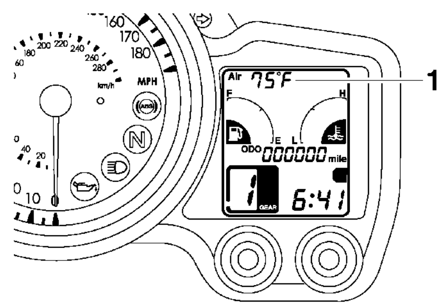
Ambient temperature, instantaneous fuel consumption and average fuel consumption modes



1. Ambient temperature/instantaneous fuel consumption/average fuel consumption
2. “SELECT” button
3. “RESET” button

Push the “RESET” button to switch the display between the ambient temperature mode “Air”, the instantaneous fuel consumption mode “MPG” and the average fuel consumption mode “AV_ _._ MPG” in the following order:
Air → MPG → AV_ _._ MPG → Air

Ambient temperature mode



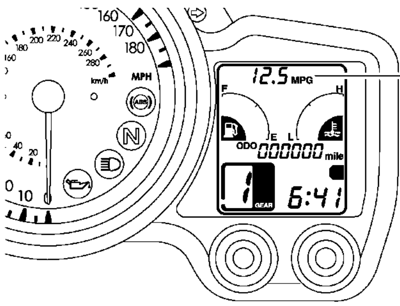
1. Ambient temperature

This display shows the ambient temperature from 16 °F to 122 °F in 1 °F increments. The temperature displayed may vary from the ambient temperature.

TIP

- If the ambient temperature falls below 16 °F, a lower temperature than 16 °F will not be displayed.
- If the ambient temperature climbs above 122 °F, a higher temperature than 122 °F will not be displayed.
- The accuracy of the temperature reading may be affected when riding slowly [approximately under 20 km/h (12.5 mi/h)] or when stopped at traffic signals, railroad crossings, etc.

Instantaneous fuel consumption mode



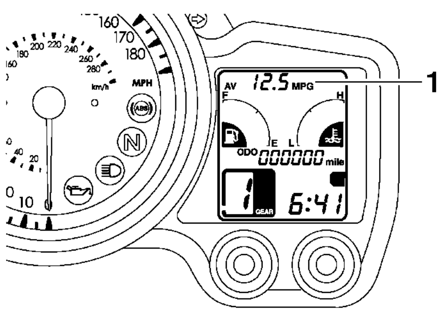
1. Instantaneous fuel consumption

This display shows the distance that can be traveled on 1.0 US.gal of fuel under the current riding conditions.

TIP

If traveling at speeds under 10 km/h (6.0 mi/h), "_ _._" will be displayed.

Average fuel consumption mode



1. Average fuel consumption

This display shows the average fuel consumption since it was last reset.
When the average fuel consumption mode is selected, the display flashes for five seconds, and then "AV_ _._ MPG" (average distance that can be traveled using 1.0 US.gal of fuel) is displayed.

TIP

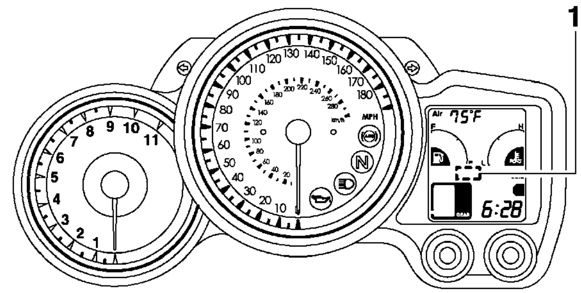
- To reset the average fuel consumption display, push the "RESET" button to select the mode again, and then push the "RESET" button for 1 second while the display is flashing.
- After resetting the average fuel consumption display, "_ _._" will be shown for that display until the vehicle has traveled 1 km (0.6 mi).

EC3P66002

NOTICE

If there is a malfunction, "– –.–" will be displayed. Replace the meter assembly.

Self-diagnosis device



1. Fault code display

This model is equipped with a self-diagnosis device for various electrical circuits.
If any of those circuits are defective, the engine trouble warning light will come on, and then the multi-function display will indicate a two-digit fault code.
If the multi-function display indicates such an fault code, note the code number, and check the vehicle.
Refer to "FUEL INJECTION SYSTEM" on page 8-57.

EC3P61042

NOTICE

If the multi-function display indicates an fault code, the vehicle should be checked as soon as possible in order to avoid engine damage.

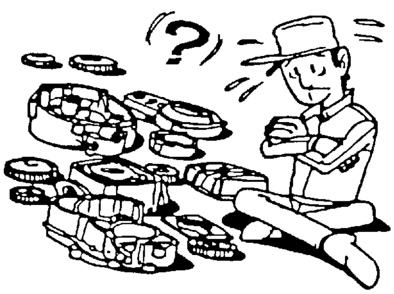
EAS20180
IMPORTANT INFORMATION

EAS20190
PREPARATION FOR REMOVAL AND DISASSEMBLY

1. Before removal and disassembly, remove all dirt, mud, dust and foreign material.



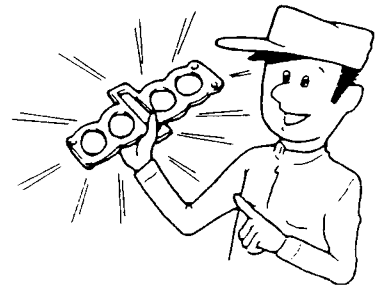
2. Use only the proper tools and cleaning equipment.
   Refer to “SPECIAL TOOLS” on page 1-32.
3. When disassembling, always keep mated parts together. This includes gears, cylinders, pistons and other parts that have been “mated” through normal wear. Mated parts must always be reused or replaced as an assembly.



4. During disassembly, clean all of the parts and place them in trays in the order of disassembly. This will speed up assembly and allow for the correct installation of all parts.
5. Keep all parts away from any source of fire.

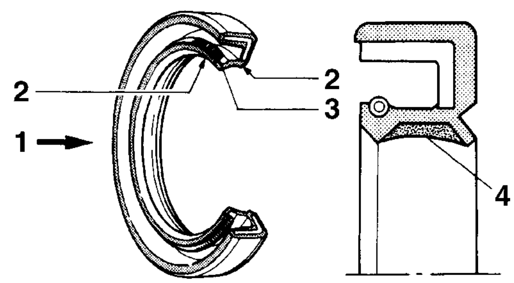
EAS20200
REPLACEMENT PARTS

Use only genuine Yamaha parts for all replacements. Use oil and grease recommended by Yamaha for all lubrication jobs. Other brands may be similar in function and appearance, but inferior in quality.



EAS20210
GASKETS, OIL SEALS AND O-RINGS

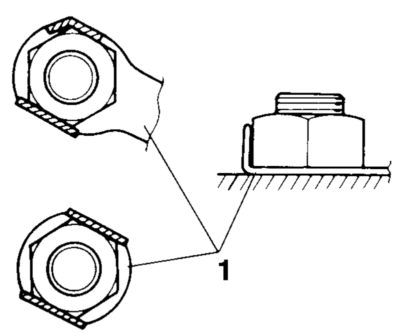
1. When overhauling the engine, replace all gaskets, seals and O-rings. All gasket surfaces, oil seal lips and O-rings must be cleaned.
2. During reassembly, properly oil all mating parts and bearings and lubricate the oil seal lips with grease.



1. Oil
2. Lip
3. Spring
4. Grease

EAS20220
LOCK WASHERS/PLATES AND COTTER PINS

After removal, replace all lock washers/plates “1” and cotter pins. After the bolt or nut has been tightened to specification, bend the lock tabs along a flat of the bolt or nut.



EAS20230

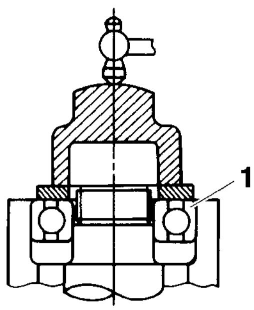
BEARINGS AND OIL SEALS

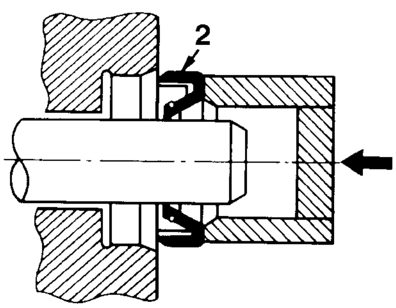
Install bearings “1” and oil seals “2” so that the manufacturer’s marks or numbers are visible. When installing oil seals, lubricate the oil seal lips with a light coat of lithium-soap-based grease. Oil bearings liberally when installing, if appropriate.

ECA13300

NOTICE

Do not spin the bearing with compressed air because this will damage the bearing surfaces.

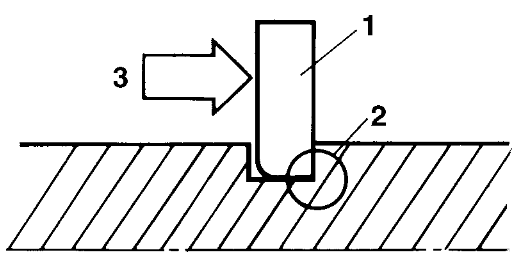




EAS20240

CIRCLIPS

Before reassembly, check all circlips carefully and replace damaged or distorted circlips. Always replace piston pin clips after one use. When installing a circlip “1”, make sure the sharp-edged corner “2” is positioned opposite the thrust “3” that the circlip receives.



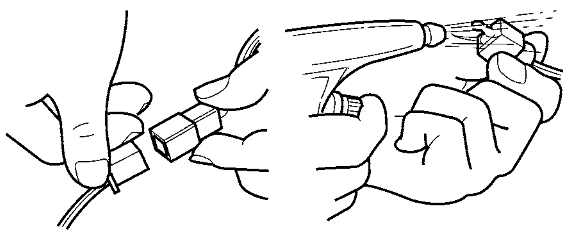
EAS20250

CHECKING THE CONNECTIONS

Check the leads, couplers, and connectors for stains, rust, moisture, etc.

1. Disconnect:
   - Lead
   - Coupler
   - Connector
2. Check:
   - Lead
   - Coupler
   - Connector

   Moisture → Dry with an air blower.
   Rust/stains → Connect and disconnect several times.

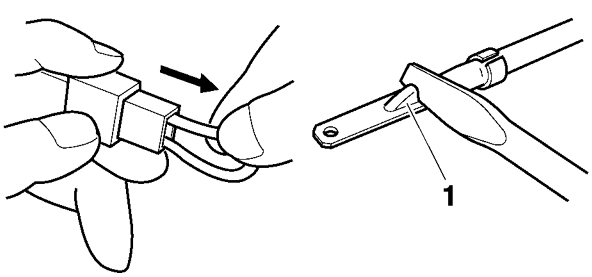


3. Check:
   - All connections

   Loose connection → Connect properly.

TIP

If the pin “1” on the terminal is flattened, bend it up.

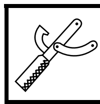


4. Connect:
   - Lead
   - Coupler
   - Connector

TIP

Make sure all connections are tight.

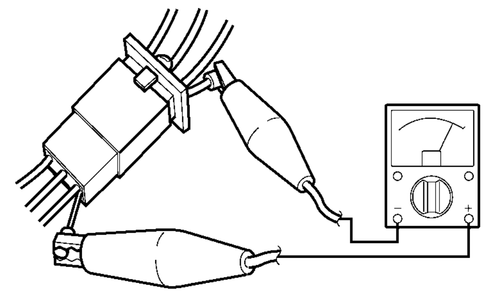
5. Check:
   - Continuity
     (with the pocket tester)

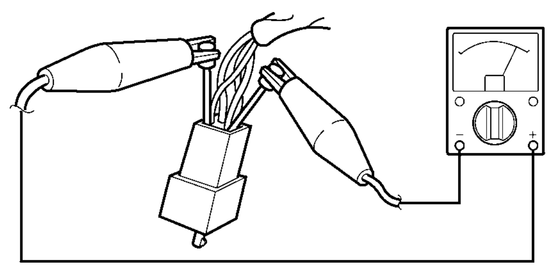


Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

TIP

- If there is no continuity, clean the terminals.
- When checking the wire harness, perform steps (1) to (3).
- As a quick remedy, use a contact revitalizer available at most part stores.





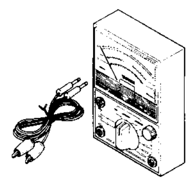
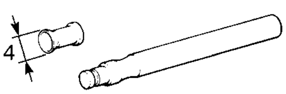
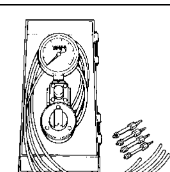
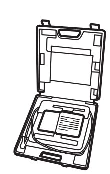
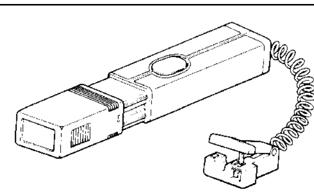
EAS20260

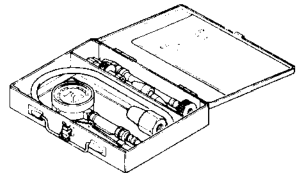
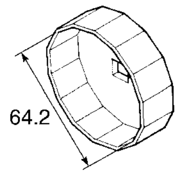
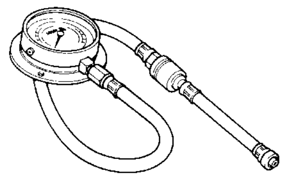
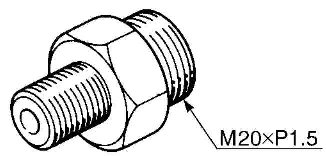
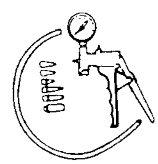
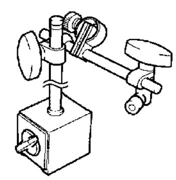
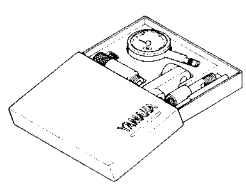
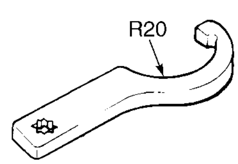
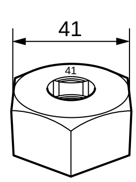
SPECIAL TOOLS

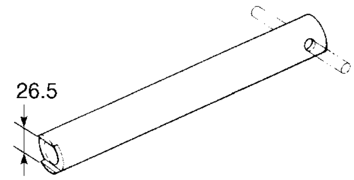
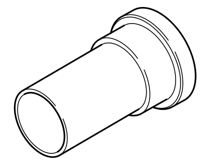
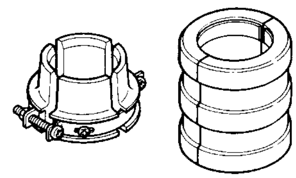
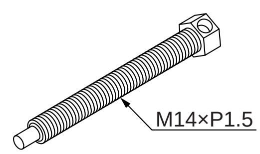
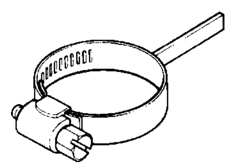
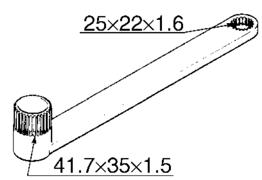
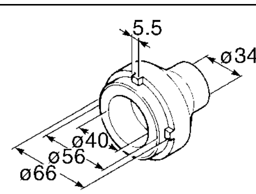
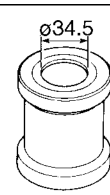
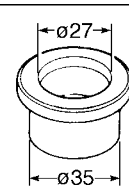
The following special tools are necessary for complete and accurate tune-up and assembly. Use only the appropriate special tools as this will help prevent damage caused by the use of inappropriate tools or improvised techniques. Special tools, part numbers or both may differ depending on the country. When placing an order, refer to the list provided below to avoid any mistakes.

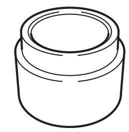
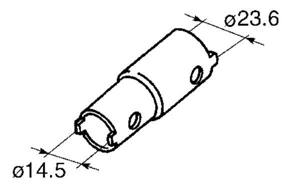
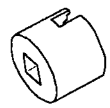
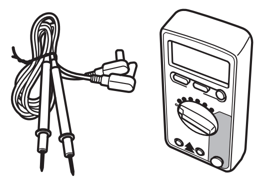
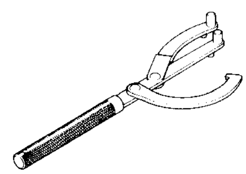
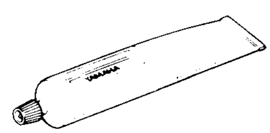
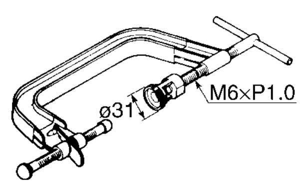
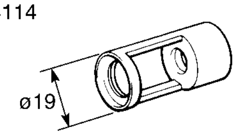
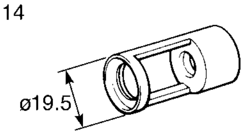
TIP

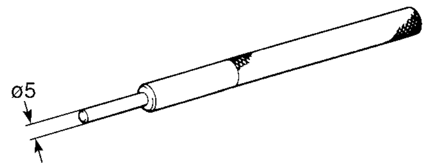
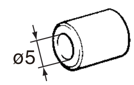
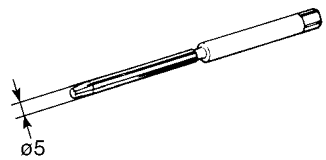
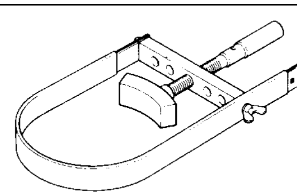
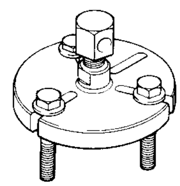
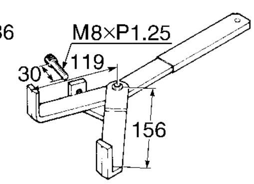
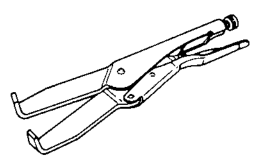
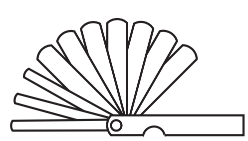
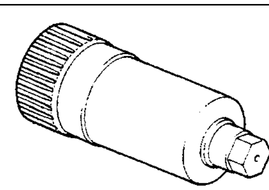
- For U.S.A. and Canada, use part number starting with “YM-”, “YU-”, or “ACC-”.
- For others, use part number starting with “90890-”.

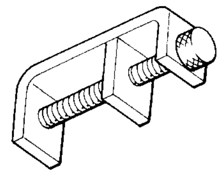
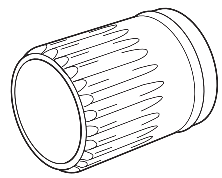
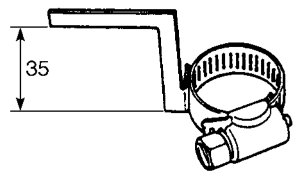
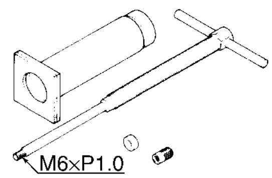
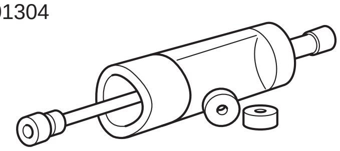
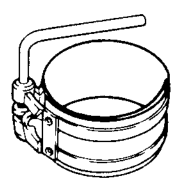
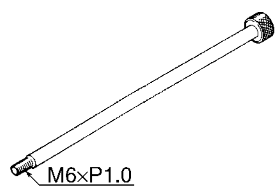
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Test coupler adapter 90890-03149		1-20, 4-66, 4-67, 8-185
Pocket tester 90890-03112 Analog pocket tester YU-03112-C		1-31, 5-44, 8-167, 8-168, 8-225, 8-226, 8-227, 8-231, 8-233, 8-234, 8-235, 8-236, 8-237, 8-238, 8-239, 8-240, 8-241, 8-242, 8-243, 8-244, 8-245
Valve lapper 90890-04101 Valve lapping tool YM-A8998		3-7
Vacuum gauge 90890-03094 Carburetor synchronizer YU-44456	90890-03094  YU-44456 	3-9
Timing light 90890-03141 Inductive clamp timing light YU-03141		3-12

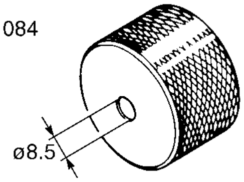
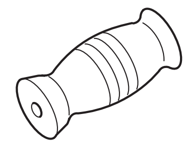
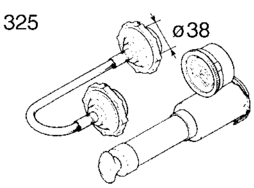
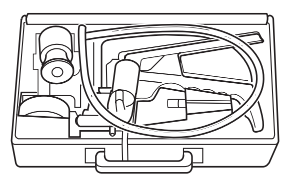
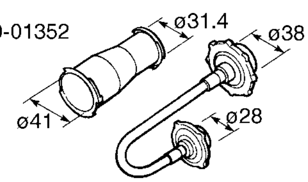
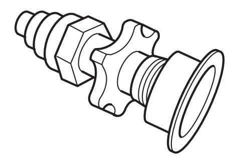
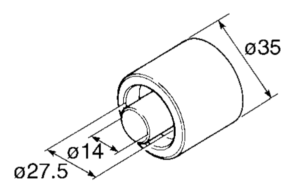
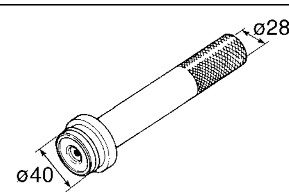
Tool name/Tool No.	Illustration	Reference pages
Compression gauge 90890-03081 Engine compression tester YU-33223		3-13
Oil filter wrench 90890-01426 YU-38411		3-15
Oil pressure gauge set 90890-03120		3-16
Oil pressure adapter B 90890-03124		3-16
Vacuum/pressure pump gauge set 90890-06756 Mityvac brake bleeding tool YS-42423		3-19
Magnet base B 90890-06844 Magnetic base stand YU-A8438		3-20
Dial gauge & stand set 90890-01252		3-20
Steering nut wrench 90890-01403 Exhaust flange nut wrench YU-A9472		3-34, 4-91
Hexagon wrench (41) 90890-01525 YM-01525		4-27, 4-29

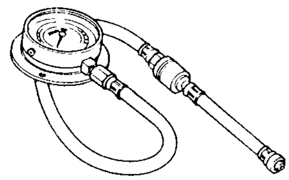
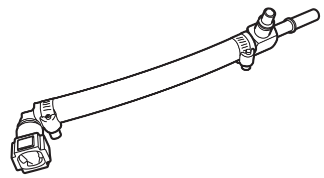
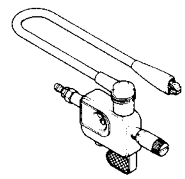
Tool name/Tool No.	Illustration	Reference pages
Damper rod holder 90890-01447 YM-01447		4-83, 4-84
Slide metal installer 90890-01508 YM-01508		4-85
Fork seal driver 90890-01502 YM-A0948		4-85, 4-86
Ring gear fix bolt (M14) 90890-01524 YM-01524		4-107
Final gear backlash band 90890-01511 Middle drive gear lash tool YM-01230		4-107
Coupling gear/middle shaft tool 90890-01229 Gear holder YM-01229		4-109, 4-112
Bearing retainer wrench 90890-04050 Pinion bearing retainer & remover YM-04050		4-109, 4-112
Fork seal driver weight 90890-01184 Replacement hammer YM-A9409-7		4-114, 4-115, 4-116
Fork seal driver attachment 90890-01186 Replacement 27 mm YM-A9409-1		4-114, 4-115

Tool name/Tool No.	Illustration	Reference pages
Oil seal installing tool 90890-01512 YM-01512		4-114, 4-116
Pivot shaft wrench 90890-01471 Frame spanner socket YM-01471		5-8, 5-9
Pivot shaft wrench adapter 90890-01476		5-8, 5-9
Digital circuit tester 90890-03174 Model 88 Multimeter with tachometer YU-A1927		5-11, 5-76, 7-9
Rotor holding tool 90890-01235 Universal magneto & rotor holder YU-01235		5-15, 5-18
Yamaha bond No. 1215 90890-85505 (Three Bond No.1215®)		5-20, 5-37, 5-40, 5-108, 6-13
Valve spring compressor 90890-04019 YM-04019		5-26, 5-31
Valve spring compressor attachment 90890-04114 Valve spring compressor adapter 19.5 mm YM-04114	90890-04114  YM-04114 	5-26, 5-31

Tool name/Tool No.	Illustration	Reference pages
Valve guide remover (ø5) 90890-04097 Valve guide remover (5.0 mm) YM-04097		5-28
Valve guide installer (ø5) 90890-04098 Valve guide installer (5.0 mm) YM-04098		5-28
Valve guide reamer (ø5) 90890-04099 Valve guide reamer (5.0 mm) YM-04099		5-28
Sheave holder 90890-01701 Primary clutch holder YS-01880-A		5-36, 5-37, 5-40
Flywheel puller 90890-01362 Heavy duty puller YU-33270-B		5-36
Universal clutch holder 90890-04086 YM-91042	90890-04086  YM-91042 	5-60, 5-61, 5-64, 5-65
Thickness gauge 90890-03180 Feeler gauge set YU-26900-9		5-62
Bearing retainer wrench 90890-04137 Middle drive shaft bearing retainer wrench YM-04137		5-93, 5-95

Tool name/Tool No.	Illustration	Reference pages
Damper spring compressor 90890-04090		5-93, 5-94
Bearing retainer wrench 90890-04140 Middle drive shaft bearing retainer wrench YM-04140		5-94
Gear lash measurement tool 90890-01467 YM-01467		5-97
Piston pin puller set 90890-01304 Piston pin puller YU-01304	90890-01304  YU-01304 	5-112
Piston ring compressor 90890-05158 YM-08037		5-118
Slide hammer bolt 90890-01083 Slide hammer bolt 6 mm YU-01083-1		5-131

Tool name/Tool No.	Illustration	Reference pages
Weight 90890-01084 YU-01083-3	90890-01084  YU-01083-3 	5-131
Radiator cap tester 90890-01325 Radiator pressure tester YU-24460-01	90890-01325  YU-24460-01 	6-3
Radiator cap tester adapter 90890-01352 Radiator pressure tester adapter YU-33984	90890-01352  YU-33984 	6-3
Mechanical seal installer 90890-04078 Water pump seal installer YM-33221-A		6-13
Middle driven shaft bearing driver 90890-04058 Bearing driver 40 mm YM-04058		6-13

Tool name/Tool No.	Illustration	Reference pages
Pressure gauge 90890-03153 YU-03153		7-8
Fuel pressure adapter 90890-03176 YM-03176		7-8
Ignition checker 90890-06754 Opama pet-4000 spark checker YM-34487		8-236

SPECIFICATIONS

EAS20280
GENERAL SPECIFICATIONS

Model	
Model	FJR13A 3P6N (USA) FJR13A 3P6P (California) FJR13AE 2D2N (USA) FJR13AE 2D2P (California)
Dimensions	
Overall length	2230 mm (87.8 in)
Overall width	750 mm (29.5 in)
Overall height	1450 mm (57.1 in)
Seat height	805 mm (31.7 in)
Wheelbase	1545 mm (60.8 in)
Ground clearance	130 mm (5.12 in)
Minimum turning radius	3100 mm (122.0 in)
Weight	
With oil and fuel	FJR13A 291.0 kg (642 lb) (USA) FJR13A 292.0 kg (644 lb) (California) FJR13AE 295.0 kg (650 lb) (USA) FJR13AE 296.0 kg (653 lb) (California)
Maximum load	FJR13A 212 kg (467 lb) (USA) FJR13A 211 kg (465 lb) (California) FJR13AE 208 kg (459 lb) (USA) FJR13AE 207 kg (456 lb) (California)

EAS20290

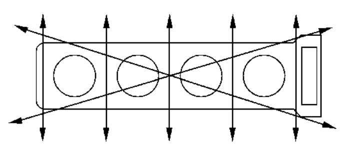
ENGINE SPECIFICATIONS

Engine	
Engine type	Liquid cooled 4-stroke, DOHC
Displacement	1298.0 cm^3
Cylinder arrangement	Forward-inclined parallel 4-cylinder
Bore × stroke	79.0 × 66.2 mm (3.11 × 2.61 in)
Compression ratio	10.80 :1
Standard compression pressure (at sea level)	1600 kPa/400 r/min (227.6 psi/400 r/min) (16.0 kgf/cm^2/400 r/min)
Minimum–maximum	1390–1790 kPa (197.7–254.6 psi) (13.9–17.9 kgf/cm^2)
Starting system	Electric starter
Fuel	
Recommended fuel	Unleaded gasoline only
Fuel tank capacity	25.0 L (6.61 US gal) (5.50 Imp.gal)
Fuel reserve amount	5.5 L (1.45 US gal) (1.21 Imp.gal)
Engine oil	
Lubrication system	Wet sump
Type	YAMALUBE 4 20W-50 or SAE 20W-50
Recommended engine oil grade	API service SG type or higher, JASO standard MA
Engine oil quantity	
Total amount	4.90 L (5.18 US qt) (4.31 Imp.qt)
Without oil filter cartridge replacement	3.80 L (4.02 US qt) (3.34 Imp.qt)
With oil filter cartridge replacement	4.00 L (4.23 US qt) (3.52 Imp.qt)
Oil pressure (hot)	30.0 kPa/1000 r/min (4.4 psi/1000 r/min) (0.30 kgf/cm^2/1000 r/min)
Final gear oil	
Type	Shaft drive gear oil (Part No.: 9079E-SH001-00)
Quantity	0.20 L (0.21 US qt) (0.18 Imp.qt)
Oil filter	
Oil filter type	Cartridge (paper)
Oil pump	
Oil pump type	Trochoid
Inner-rotor-to-outer-rotor-tip clearance	Less than 0.12 mm (0.0047 in)
Limit	0.20 mm (0.0079 in)
Outer-rotor-to-oil-pump-housing clearance	0.090–0.150 mm (0.0035–0.0059 in)
Limit	0.220 mm (0.0087 in)
Oil-pump-housing-to-inner-and-outer-rotor clearance	0.03–0.08 mm (0.0012–0.0032 in)
Limit	0.15 mm (0.0059 in)
Bypass valve opening pressure	78.4–117.6 kPa (11.4–17.1 psi) (0.78–1.18 kgf/cm^2)
Relief valve operating pressure	480.0–560.0 kPa (69.6–81.2 psi) (4.80–5.60 kgf/cm^2)

Cooling system	
Radiator capacity (including all routes)	2.60 L (2.75 US qt) (2.29 Imp.qt)
Radiator capacity	0.65 L (0.69 US qt) (0.57 Imp.qt)
Coolant reservoir capacity (up to the maximum level mark)	0.25 L (0.26 US qt) (0.22 Imp.qt)
Radiator cap opening pressure	93.3–122.7 kPa (13.5–17.8 psi) (0.93–1.23 kgf/cm^2)
Valve relief pressure	4.9 kPa (0.7 psi) (0.05 kgf/cm^2)
Thermostat	
Model/manufacturer	4FM/NIPPON THERMOSTAT
Valve opening temperature	69.0–73.0 °C (156.20–163.40 °F)
Valve full open temperature	85.0 °C (185.00 °F)
Valve lift (full open)	8.0 mm (0.31 in)
Radiator core	
Width	360.0 mm (14.17 in)
Height	273.8 mm (10.78 in)
Depth	22.0 mm (0.87 in)
Water pump	
Water pump type	Single suction centrifugal pump
Reduction ratio	75/48 × 25/28 (1.395)
Impeller shaft tilt limit	0.15 mm (0.006 in)

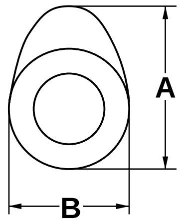
Spark plug (s)	
Manufacturer/model	NGK/CR8E
Manufacturer/model	DENSO/U24ESR-N
Spark plug gap	0.7–0.8 mm (0.028–0.031 in)

Cylinder head	
Volume	22.74–23.34 cm^3 (1.39–1.42 cu.in)
Warpage limit	0.10 mm (0.0039 in)

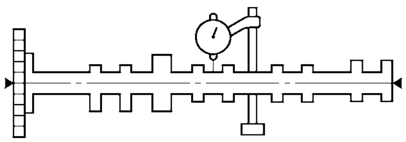


Camshaft	
Drive system	Chain drive (right)
Camshaft cap inside diameter	24.500–24.521 mm (0.9646–0.9654 in)
Camshaft journal diameter	24.459–24.472 mm (0.9630–0.9635 in)
Camshaft-journal-to-camshaft-cap clearance	0.028–0.062 mm (0.0011–0.0024 in)
Camshaft lobe dimensions	
Intake A	33.050–33.150 mm (1.3012–1.3051 in)
Limit	32.050 mm (1.2618 in)
Intake B	24.997–25.097 mm (0.9841–0.9881 in)
Limit	23.997 mm (0.9448 in)
Exhaust A	33.050–33.150 mm (1.3012–1.3051 in)
Limit	32.950 mm (1.2972 in)
Exhaust B	24.997–25.097 mm (0.9841–0.9881 in)

Limit	24.897 mm (0.9802 in)



Camshaft runout limit	0.030 mm (0.0012 in)

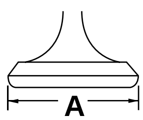


Timing chain

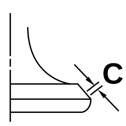
Model/number of links	92RH2015/136
Tensioning system	Automatic

Valve, valve seat, valve guide

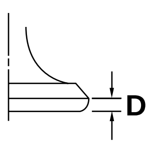
Valve clearance (cold)	
Intake	0.15–0.22 mm (0.0059–0.0087 in)
Exhaust	0.18–0.25 mm (0.0071–0.0098 in)
Valve dimensions	
Valve head diameter A (intake)	29.90–30.10 mm (1.1772–1.1850 in)
Valve head diameter A (exhaust)	25.90–26.10 mm (1.0197–1.0276 in)



Valve seat width C (intake)	0.90–1.10 mm (0.0354–0.0433 in)
Valve seat width C (exhaust)	0.90–1.10 mm (0.0354–0.0433 in)

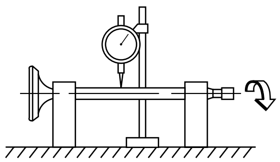


Valve margin thickness D (intake)	0.80–1.20 mm (0.0315–0.0472 in)
Valve margin thickness D (exhaust)	0.50–0.90 mm (0.0197–0.0354 in)



Valve stem diameter (intake)	4.975–4.990 mm (0.1959–0.1965 in)
Valve stem diameter (exhaust)	4.965–4.980 mm (0.1955–0.1961 in)
Valve guide inside diameter (intake)	5.000–5.012 mm (0.1969–0.1973 in)
Limit	5.050 mm (0.1988 in)
Valve guide inside diameter (exhaust)	5.000–5.012 mm (0.1969–0.1973 in)
Limit	5.050 mm (0.1988 in)
Valve-stem-to-valve-guide clearance (intake)	0.010–0.037 mm (0.0004–0.0015 in)
Limit	0.080 mm (0.0032 in)

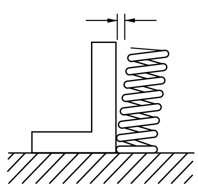
Valve-stem-to-valve-guide clearance (exhaust)	0.020–0.047 mm (0.0008–0.0019 in)
Limit	0.105 mm (0.0041 in)
Valve stem runout	0.010 mm (0.0004 in)



Cylinder head valve seat width (intake)	0.90–1.10 mm (0.0354–0.0433 in)
Cylinder head valve seat width (exhaust)	0.90–1.10 mm (0.0354–0.0433 in)

Valve spring

Free length (intake)	39.73 mm (1.56 in)
Limit	37.74 mm (1.49 in)
Free length (exhaust)	39.73 mm (1.56 in)
Limit	37.74 mm (1.49 in)
Installed length (intake)	33.00 mm (1.30 in)
Installed length (exhaust)	33.00 mm (1.30 in)
Spring rate K1 (intake)	21.85 N/mm (124.76 lb/in) (2.23 kgf/mm)
Spring rate K2 (intake)	28.34 N/mm (161.82 lb/in) (2.89 kgf/mm)
Spring rate K1 (exhaust)	21.85 N/mm (124.76 lb/in) (2.23 kgf/mm)
Spring rate K2 (exhaust)	28.34 N/mm (161.82 lb/in) (2.89 kgf/mm)
Installed compression spring force (intake)	136.00–158.00 N (30.57–35.52 lb) (13.87–16.11 kgf)
Installed compression spring force (exhaust)	136.00–158.00 N (30.57–35.52 lb) (13.87–16.11 kgf)
Spring tilt (intake)	2.5°/1.7 mm (2.5°/0.067 in)
Spring tilt (exhaust)	2.5°/1.7 mm (2.5°/0.067 in)



Winding direction (intake)	Clockwise
Winding direction (exhaust)	Clockwise

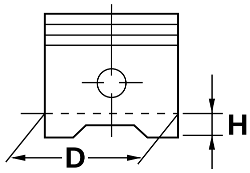
Cylinder

Bore	79.000–79.010 mm (3.1102–3.1106 in)
Taper limit	0.050 mm (0.0020 in)
Out of round limit	0.050 mm (0.0020 in)

Piston

Piston-to-cylinder clearance	0.020–0.045 mm (0.0008–0.0018 in)
Limit	0.12 mm (0.0047 in)
Diameter D	78.965–78.980 mm (3.1089–3.1094 in)

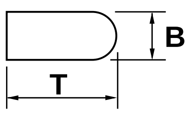
Height H	5.0 mm (0.20 in)



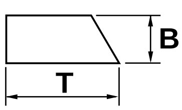
Offset	0.50 mm (0.0197 in)
Offset direction	Intake side
Piston pin bore inside diameter	19.004–19.015 mm (0.7482–0.7486 in)
Limit	19.045 mm (0.7498 in)
Piston pin outside diameter	18.991–19.000 mm (0.7477–0.7480 in)
Limit	18.971 mm (0.7469 in)
Piston-pin-to-piston-pin-bore clearance	0.004–0.024 mm (0.00016–0.00094 in)

Piston ring

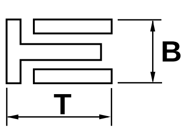
Top ring	
Ring type	Barrel
Dimensions (B × T)	1.00 × 2.80 mm (0.04 × 0.11 in)



End gap (installed)	0.35–0.45 mm (0.0138–0.0177 in)
Limit	0.70 mm (0.0276 in)
Ring side clearance	0.030–0.070 mm (0.0012–0.0028 in)
Limit	0.120 mm (0.0047 in)
2nd ring	
Ring type	Taper
Dimensions (B × T)	1.00 × 2.90 mm (0.04 × 0.11 in)



End gap (installed)	0.75–0.85 mm (0.0295–0.0335 in)
Limit	1.20 mm (0.0472 in)
Ring side clearance	0.020–0.060 mm (0.0008–0.0024 in)
Limit	0.120 mm (0.0047 in)
Oil ring	
Dimensions (B × T)	2.00 × 2.50 mm (0.08 × 0.10 in)



End gap (installed)	0.20–0.60 mm (0.0079–0.0236 in)
Ring side clearance	0.060–0.150 mm (0.0024–0.0059 in)

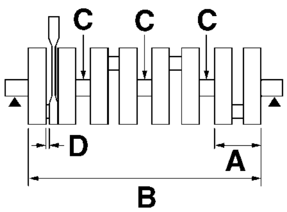
Connecting rod

Oil clearance (using plastigauge®)	0.031–0.048 mm (0.0012–0.0019 in)
Bearing color code	1.Blue 2.Black 3.Brown 4.Green 5.Yellow 6.Pink

Small end inside diameter	19.005–19.018 mm (0.7482–0.7487 in)

Crankshaft

Width A	61.60–63.20 mm (2.425–2.488 in)
Width B	325.10–326.30 mm (12.80–12.85 in)
Runout limit C	0.030 mm (0.0012 in)
Big end side clearance D	0.160–0.262 mm (0.0063–0.0103 in)



Journal oil clearance (using plastigauge®)	0.027–0.045 mm (0.0011–0.0018 in)
Bearing color code	2.Black 3.Brown 4.Green 5.Yellow 6.Pink 7.Red 8.White

Balancer

Balancer drive method	Gear

Clutch

Clutch type	Wet, multiple-disc
Clutch release method	Hydraulic inner push
Clutch lever free play	FJR13A 1.9–20.7 mm (0.07–0.81 in)
Friction plate thickness	2.90–3.10 mm (0.114–0.122 in)
Wear limit	2.80 mm (0.1102 in)
Plate quantity	9 pcs
Clutch plate thickness	1.90–2.10 mm (0.075–0.083 in)
Plate quantity	8 pcs
Warpage limit	0.10 mm (0.0039 in)
Clutch spring height	6.78 mm (0.27 in)
Minimum height	6.4 mm (0.25 in)
Spring quantity	1 pc
Push rod bending limit	0.370 mm (0.0146 in)
Clutch pressure plate stroke	FJR13AE 2.8 mm (0.11 in) or more

Transmission

Transmission type	Constant mesh 5-speed
Primary reduction system	Spur gear
Primary reduction ratio	75/48 (1.563)
Secondary reduction system	Shaft drive
Secondary reduction ratio	35/37 × 21/27 × 33/9 (2.698)
Operation	FJR13A Left foot operation FJR13AE Left foot and left hand operation
Gear ratio	
1st	43/17 (2.529)
2nd	39/22 (1.773)
3rd	31/23 (1.348)
4th	28/26 (1.077)
5th	26/28 (0.929)
Main axle runout limit	0.08 mm (0.0032 in)

Drive axle runout limit	0.08 mm (0.0032 in)
Shifting mechanism	
Shift mechanism type	Shift drum and guide bar
Shift fork guide bar bending limit	0.100 mm (0.0039 in)
Air filter	
Air filter element	Dry element
Fuel pump	
Pump type	Electrical
Model/manufacturer	5JW 21/DENSO
Maximum consumption amperage	6.0 A
Output pressure	324.0 kPa (47.0 psi) (3.24 kgf/cm²)
Fuel injector	
Model/quantity	INP-151/4
Manufacturer	NIPPON INJECTOR
Throttle body	
Type/quantity	42EHS/4
Manufacturer	MIKUNI
ID mark	3P6D 20 (USA) 3P6H 30 (California)
Throttle position sensor	
Resistance	2.00–3.00 kΩ
Output voltage (at idle)	0.63–0.73 V
Fuel injection sensor	
Crankshaft position sensor resistance	421–569 Ω at 20 °C (68 °F)
Cylinder identification sensor output voltage (ON)	More than 4.8 V
Cylinder identification sensor output voltage (OFF)	Less than 0.6 V
Intake air pressure sensor output voltage	3.75–4.25 V
Intake air temperature sensor resistance	290–390 Ω at 80 °C (176 °F)
Coolant temperature sensor resistance	290–354 Ω at 80 °C (176 °F)
Idling condition	
Engine idling speed	1000–1100 r/min
Intake vacuum	33.3 kPa (9.8 inHg) (250 mmHg)
Water temperature	100.0–105.0 °C (212.00–221.00 °F)
Oil temperature	80.0–90.0 °C (176.00–194.00 °F)
Throttle cable free play	3.0–5.0 mm (0.12–0.20 in)
Air induction system	
Solenoid resistance	19–25 Ω at 20 °C (68 °F)
Shaft drive	
Middle gear backlash	0.10–0.20 mm (0.0039–0.0079 in)
Ring-gear-to-stopper-bolt clearance	0.30–0.60 mm (0.0118–0.0236 in)
Ring-gear-to-thrust-washer clearance	0.10–0.20 mm (0.0039–0.0079 in)
Final gear backlash	0.22–0.45 mm (0.0087–0.0177 in)

EAS20300
CHASSIS SPECIFICATIONS

Chassis	
Frame type	Diamond
Caster angle	26.00°
Trail	109.0 mm (4.29 in)
Front wheel	
Wheel type	Cast wheel
Rim size	17M/C × MT3.50
Rim material	Aluminum
Wheel travel	135.0 mm (5.31 in)
Radial wheel runout limit	1.0 mm (0.04 in)
Lateral wheel runout limit	0.5 mm (0.02 in)
Rear wheel	
Wheel type	Cast wheel
Rim size	17M/C × MT5.50
Rim material	Aluminum
Wheel travel	125.0 mm (4.92 in)
Radial wheel runout limit	1.0 mm (0.04 in)
Lateral wheel runout limit	0.5 mm (0.02 in)
Front tire	
Type	Tubeless
Size	120/70 ZR17M/C (58W)
Manufacturer/model	METZELER/Roadtec Z6G
Manufacturer/model	BRIDGESTONE/BT021F F
Wear limit (front)	1.0 mm (0.04 in)
Rear tire	
Type	Tubeless
Size	180/55 ZR17M/C (73W)
Manufacturer/model	METZELER/Roadtec Z6C
Manufacturer/model	BRIDGESTONE/BT021R F
Wear limit (rear)	1.0 mm (0.04 in)
Tire air pressure (measured on cold tires)	
Loading condition	0–90 kg (0–198 lb)
Front	270 kPa (39 psi) (2.70 kgf/cm²)
Rear	290 kPa (42 psi) (2.90 kgf/cm²)
Loading condition	FJR13A 90–212 kg (198–467 lb) (USA) FJR13A 90–211 kg (198–465 lb) (California) FJR13AE 90–208 kg (198–459 lb) (USA) FJR13AE 90–207 kg (198–456 lb) (California)
Front	270 kPa (39 psi) (2.70 kgf/cm²)
Rear	290 kPa (42 psi) (2.90 kgf/cm²)
High-speed riding	
Front	270 kPa (39 psi) (2.70 kgf/cm²)
Rear	290 kPa (42 psi) (2.90 kgf/cm²)

Front brake	
Type	Dual disc brake
Operation	Right hand operation
Front disc brake	
Disc outside diameter × thickness	320.0 × 4.5 mm (12.60 × 0.18 in)
Brake disc thickness limit	4.0 mm (0.16 in)
Brake disc deflection limit	0.10 mm (0.0039 in)
Brake pad lining thickness (inner)	5.5 mm (0.22 in)
Limit	0.5 mm (0.02 in)
Brake pad lining thickness (outer)	5.5 mm (0.22 in)
Limit	0.5 mm (0.02 in)
Master cylinder inside diameter	15.00 mm (0.59 in)
Caliper cylinder inside diameter	30.23 mm × 4 (1.19 in × 4)
Caliper cylinder inside diameter (for unified brake)	33.96 mm × 2, 22.65 mm × 2 (1.34 in × 2, 0.89 in × 2)
Recommended fluid	DOT 4

Rear brake	
Type	Single disc brake
Operation	Right foot operation
Brake pedal position	42.0 mm (1.65 in) (below the top of the rider footrest)
Rear disc brake	
Disc outside diameter × thickness	282.0 × 5.0 mm (11.10 × 0.20 in)
Brake disc thickness limit	4.5 mm (0.18 in)
Brake disc deflection limit	0.15 mm (0.0059 in)
Brake pad lining thickness (inner)	6.3 mm (0.25 in)
Limit	0.8 mm (0.03 in)
Brake pad lining thickness (outer)	6.3 mm (0.25 in)
Limit	0.8 mm (0.03 in)
Master cylinder inside diameter	15.0 mm (0.59 in)
Caliper cylinder inside diameter	41.30 mm (1.63 in)
Recommended fluid	DOT 4

Clutch	
Recommended fluid	DOT 4
Master cylinder inside diameter	14.0 mm (0.55 in)
Release cylinder inside diameter	33.6 mm (1.32 in)

Steering	
Steering bearing type	Angular bearing
Center to lock angle (left)	34.0°
Center to lock angle (right)	34.0°

Front suspension	
Type	Telescopic fork
Spring/shock absorber type	Coil spring/oil damper
Front fork travel	135.0 mm (5.31 in)
Fork spring free length	262.0 mm (10.31 in)
Limit	257.0 mm (10.12 in)
Collar length	149.5 mm (5.89 in)
Installed length	251.0 mm (9.88 in)

Spring rate K1	8.30 N/mm (47.39 lb/in) (0.85 kgf/mm)
Spring stroke K1	0.0–135.0 mm (0.00–5.31 in)
Inner tube outer diameter	48.0 mm (1.89 in)
Inner tube bending limit	0.2 mm (0.01 in)
Optional spring available	No
Recommended oil	Ohlins R & T43 (ACC-RT43F-00-00)
Quantity	696.0 cm^3 (23.53 US oz) (24.55 Imp.oz)
Level	92.0 mm (3.62 in)

Rear suspension

Type	Swingarm (link suspension)
Spring/shock absorber type	Coil spring/gas-oil damper
Rear shock absorber assembly travel	60.0 mm (2.36 in)
Spring free length	154.6 mm (6.09 in)
Installed length	136.2 mm (5.36 in)
Spring free length	73.9 mm (2.91 in)
Installed length	67.3 mm (2.65 in)
Soft	
Spring rate K1	91.00 N/mm (519.61 lb/in) (9.28 kgf/mm)
Spring rate K2	124.00 N/mm (708.04 lb/in) (12.64 kgf/mm)
Spring stroke K1	0.0–42.0 mm (0.00–1.65 in)
Spring stroke K2	42.0–60.0 mm (1.65–2.36 in)
Hard	
Spring rate K1	124.00 N/mm (708.04 lb/in) (12.64 kgf/mm)
Spring stroke K1	7.0–60.0 mm (0.28–2.36 in)
Optional spring available	No
Enclosed gas/air pressure (STD)	1200 kPa (170.7 psi) (12.0 kgf/cm^2)

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ELECTRICAL SPECIFICATIONS

Voltage	
System voltage	12 V
Ignition system	
Ignition system	Transistorized coil ignition (digital)
Ignition timing (B.T.D.C.)	5.0°/1050 r/min
Engine control unit	
Model/manufacturer	FUA0025/MITSUBISHI
Ignition coil	
Model/manufacturer	JO383/DENSO
Minimum ignition spark gap	6.0 mm (0.24 in)
Primary coil resistance	1.53–2.07 Ω at 20 °C (68 °F)
Secondary coil resistance	12–18 kΩ at 20 °C (68 °F)
Spark plug cap	
Material	Resin
Resistance	10.0 kΩ
AC magneto	
Model/manufacturer	LNX07/DENSO
Standard output	14.0 V, 590 W at 5000 r/min
Stator coil resistance	0.13–0.19 Ω at 20 °C (68 °F)
Voltage regulator	
Rectifier/regulator	
Regulator type	Semi conductor-short circuit
Model/manufacturer	FH012AA/SHINDENGEN
Regulated voltage (DC)	14.2–14.8 V
Rectifier capacity (DC)	50.0 A
Withstand voltage	40.0 V
Battery	
Model	GT14B-4
Voltage, capacity	12 V, 12.0 Ah
Manufacturer	GS YUASA
Ten hour rate amperage	1.20 A
Headlight	
Bulb type	Halogen bulb
Bulb voltage, wattage × quantity	
Headlight	12 V, 60 W/55.0 W × 2
Tail/brake light	12 V, 5.0 W/21.0 W × 2
Front turn signal/position light	12 V, 21.0 W/5.0 W × 2
Rear turn signal light	12 V, 21.0 W × 2
License plate light	12 V, 5.0 W × 1
Meter lighting	LED

Indicator light	
Neutral indicator light	LED
Turn signal indicator light	LED
Oil level warning light	LED
High beam indicator light	LED
Engine trouble warning light	LED
ABS warning light	LED
Electric starting system	
System type	Constant mesh
Starter motor	
Model/manufacturer	3P6/YAMAHA
Power output	0.80 kW
Armature coil resistance	0.024–0.030 Ω at 20 °C (68 °F)
Brush overall length	10.8 mm (0.43 in)
Limit	3.65 mm (0.14 in)
Brush spring force	5.28–7.92 N (19.01–28.51 oz) (538–808 gf)
Commutator diameter	24.5 mm (0.96 in)
Limit	23.5 mm (0.93 in)
Mica undercut (depth)	1.50 mm (0.06 in)
Starter relay	
Model/manufacturer	RC19–085A/MITSUBA
Amperage	180.0 A
Coil resistance	4.18–4.62 Ω
Horn	
Horn type	Plane
Quantity	2 pcs
Model/manufacturer	HF-12/NIKKO
Maximum amperage	3.0 A
Coil resistance	1.01–1.11 Ω at 20 °C (68 °F)
Performance	108–116 dB/2 m (6.6 ft)
Turn signal/hazard relay	
Relay type	Full transistor
Model/manufacturer	FE246BH/DENSO
Built-in, self-canceling device	No
Turn signal blinking frequency	75.0–95.0 cycles/min
Wattage	21 W × 2.0
Oil level switch	
Model/manufacturer	3P6/DENSO
Fuel gauge	
Model/manufacturer	5JW/DENSO
Sender unit resistance (full)	19.0–21.0 Ω
Sender unit resistance (empty)	139.0–141.0 Ω
Starting circuit cut-off relay	
Model/manufacturer	G8R-30Y-V3/OMRON

Coil resistance	180.0 Ω
Headlight relay	
Model/manufacturer	ACM33211 M05/MATSUSHITA
Coil resistance	96.0 Ω
Radiator fan	
Model/manufacturer	3P6/DENSO
Running rpm	4250 r/min
Fan motor relay	
Model/manufacturer	ACM33211 M05/MATSUSHITA
Coil resistance	96.0 Ω
Gear position sensor	
Output voltage (at neutral position)	FJR13AE 0.71–0.91 V
Resistance	FJR13AE 4.0–6.0 kΩ
Foot shift switch	
Output voltage	FJR13AE 2.4–2.6 V
Resistance	FJR13AE 4.0–6.0 kΩ
Grip warmer	
Grip warmer resistance (L)	FJR13AE 1.21–1.48 Ω at 20 °C (68 °F)
Grip warmer resistance (R)	FJR13AE 1.17–1.43 Ω at 20 °C (68 °F)
Fuses	
Main fuse	50.0 A
Headlight fuse	25.0 A
Signaling system fuse	15.0 A
Ignition fuse	10.0 A
Radiator fan fuse	15.0 A × 2
Auxiliary DC jack fuse	3.0 A
Hazard fuse	10.0 A
Fuel injection system fuse	15.0 A
ABS motor fuse	30.0 A
ABS solenoid fuse	20.0 A
ABS ECU fuse	10.0 A
YCC-S motor control fuse	FJR13AE 30.0 A
Backup fuse	10.0 A
Spare fuse	30.0 A
Spare fuse	25.0 A
Spare fuse	20.0 A
Spare fuse	15.0 A
Spare fuse	10.0 A
Spare fuse	3.0 A

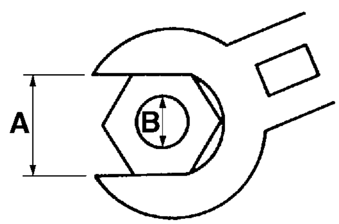
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TIGHTENING TORQUES

EAS20330

GENERAL TIGHTENING TORQUE SPECIFICATIONS

This chart specifies tightening torques for standard fasteners with a standard ISO thread pitch. Tightening torque specifications for special components or assemblies are provided for each chapter of this manual. To avoid warpage, tighten multi-fastener assemblies in a crisscross pattern and progressive stages until the specified tightening torque is reached. Unless otherwise specified, tightening torque specifications require clean, dry threads. Components should be at room temperature.



A. Distance between flats
B. Outside thread diameter

A (nut)	B (bolt)	General tightening torques		
		Nm	m·kg	ft·lb
10 mm	6 mm	6	0.6	4.3
12 mm	8 mm	15	1.5	11
14 mm	10 mm	30	3.0	22
17 mm	12 mm	55	5.5	40
19 mm	14 mm	85	8.5	61
22 mm	16 mm	130	13.0	94

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ENGINE TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Spark plug	M10	4	13 Nm (1.3 m·kg, 9.4 ft·lb)	
Cylinder head bolt	M10	10	See NOTE.	E
Cylinder head bolt	M6	2	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Camshaft cap bolt	M6	20	10 Nm (1.0 m·kg, 7.2 ft·lb)	E
Cylinder head cover bolt	M6	8	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Engine oil check bolt	M8	1	15 Nm (1.5 m·kg, 11 ft·lb)	
Cylinder head stud bolt (exhaust pipe)	M8	8	15 Nm (1.5 m·kg, 11 ft·lb)	
Reed valve cover bolt	M6	6	14 Nm (1.4 m·kg, 10 ft·lb)	LT
Connecting rod nut	M8	8	See NOTE.	M
Generator rotor bolt	M12	1	130 Nm (13.0 m·kg, 94 ft·lb)	E
Pickup rotor bolt	M10	1	45 Nm (4.5 m·kg, 32 ft·lb)	
Front balancer lever bolt	M8	1	14 Nm (1.4 m·kg, 10 ft·lb)	LT
Rear balancer lever bolt	M8	1	14 Nm (1.4 m·kg, 10 ft·lb)	LT
Front balancer shaft pinch bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Rear balancer shaft pinch bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Timing chain tensioner bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Timing chain tensioner cap bolt	M6	1	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Camshaft sprocket bolt	M7	4	24 Nm (2.4 m·kg, 17 ft·lb)	
Water pump assembly bolt	M6	3	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Water pump housing cover bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Coolant drain bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Water jacket joint bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	LT
Thermostat inlet pipe 1 bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Thermostat housing cover/radiator filler pipe bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Thermostat housing bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Oil cooler bolt	M6	4	12 Nm (1.2 m·kg, 8.7 ft·lb)	LT
Engine oil drain bolt	M14	1	43 Nm (4.3 m·kg, 31 ft·lb)	
Oil strainer bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	LT
Oil pump assembly bolt	M6	3	12 Nm (1.2 m·kg, 8.7 ft·lb)	LT
Oil delivery pipe 2 bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	LT
Oil delivery pipe 3 bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	LT
Oil filter cartridge bolt	M20	1	70 Nm (7.0 m·kg, 50 ft·lb)	
Oil filter cartridge	M20	1	17 Nm (1.7 m·kg, 12 ft·lb)	
Oil pan bolt	M6	20	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Oil pump drive chain guide bolt	M6	2	12 Nm (1.2 m·kg, 8.7 ft·lb)	LT

Item	Thread size	Q'ty	Tightening torque	Remarks
Oil pump housing cover bolt	M6	3	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Oil level switch bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Throttle body joint clamp screw	M4	8	3 Nm (0.3 m·kg, 2.2 ft·lb)	
Air filter case joint clamp screw	M4	4	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Air filter case and rear lower fuel tank bracket bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Intake air pressure sensor bolt	M5	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Exhaust pipe assembly nut	M8	8	20 Nm (2.0 m·kg, 14 ft·lb)	
Muffler and exhaust pipe assembly bolt	M8	2	20 Nm (2.0 m·kg, 14 ft·lb)	
Exhaust pipe assembly bolt	M8	2	17 Nm (1.7 m·kg, 12 ft·lb)	
Muffler bolt	M10	2	25 Nm (2.5 m·kg, 18 ft·lb)	
Crankcase bolt	M9	10	See NOTE.	E
Crankcase bolt	M6	2	12 Nm (1.2 m·kg, 8.7 ft·lb)	E
Crankcase bolt	M6	17	10 Nm (1.0 m·kg, 7.2 ft·lb)	E
Crankcase bolt	M8	2	24 Nm (2.4 m·kg, 17 ft·lb)	E
Crankcase blind plug (FJR13A)	M10	1	20 Nm (2.0 m·kg, 14 ft·lb)	
Neutral switch (FJR13AE)	M10	1	20 Nm (2.0 m·kg, 14 ft·lb)	
Lower crankcase plug bolt (FJR13A)	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	LT
YCC-S speed sensor bolt (FJR13AE)	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	LT
Generator cover bolt	M6	11	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Clutch cover bolt	M6	10	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Middle gear case cover bolt	M6	9	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Pickup rotor cover bolt	M6	8	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Rear balancer cover bolt	M6	4	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Oil baffle plate 1 bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	LT
Oil baffle plate 2 bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	LT
Timing mark accessing plug	M8	1	15 Nm (1.5 m·kg, 11 ft·lb)	
Oil guide plate bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	LT
Damper cover bolt (middle gear case cover)	M6	4	10 Nm (1.0 m·kg, 7.2 ft·lb)	LT
Oil baffle plate 3 bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	LT
Upper crankcase plug bolt	M6	1	12 Nm (1.2 m·kg, 8.7 ft·lb)	LT
Crankcase damper bolt	M6	3	12 Nm (1.2 m·kg, 8.7 ft·lb)	LT
Damper cover bolt (clutch cover)	M6	5	12 Nm (1.2 m·kg, 8.7 ft·lb)	LT
Stator assembly lead holder bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	LT
Main gallery bolt	M20	1	12 Nm (1.2 m·kg, 8.7 ft·lb)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Starter clutch bolt	M8	3	32 Nm (3.2 m·kg, 23 ft·lb)	LT
Clutch boss nut	M20	1	90 Nm (9.0 m·kg, 65 ft·lb)	Use a lock washer.
Clutch spring bolt	M6	6	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Clutch release cylinder bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Clutch hose union bolt	M10	1	30 Nm (3.0 m·kg, 22 ft·lb)	
Bleed screw (clutch release cylinder)	M8	1	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Main axle assembly screw	M6	3	12 Nm (1.2 m·kg, 8.7 ft·lb)	LT Stake
Middle drive pinion gear nut	M22	1	110 Nm (11.0 m·kg, 80 ft·lb)	E Use a lock washer.
Middle drive shaft bearing housing bolt	M6	3	12 Nm (1.2 m·kg, 8.7 ft·lb)	
Bearing retainer (middle drive shaft)	M88	1	110 Nm (11.0 m·kg, 80 ft·lb)	Stake
Middle driven pinion gear nut	M28	1	110 Nm (11.0 m·kg, 80 ft·lb)	LT Stake
Bearing retainer (middle driven shaft)	M68	1	110 Nm (11.0 m·kg, 80 ft·lb)	Stake
Middle driven shaft end cover bolt	M8	3	25 Nm (2.5 m·kg, 18 ft·lb)	LT
Shift drum retainer bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	LT
Shift shaft spring stopper bolt	M8	1	22 Nm (2.2 m·kg, 16 ft·lb)	LT
Stator coil assembly bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	LT
Gear position switch bolt (FJR13A)	M5	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	LT
Crankshaft position sensor bolt	M5	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	LT
O_2 sensor	M18	1	45 Nm (4.5 m·kg, 32 ft·lb)	
Intake air temperature sensor	M12	1	18 Nm (1.8 m·kg, 13 ft·lb)	
Cylinder identification sensor bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	LT
Coolant temperature sensor	M12	1	18 Nm (1.8 m·kg, 13 ft·lb)	
Starter motor bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Throttle position sensor screw	M5	2	3.5 Nm (0.35 m·kg, 2.53 ft·lb)	
Radiator bolt	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Radiator cover bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	LT
Radiator bracket bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Coolant reservoir bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Coolant reservoir bracket bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Clutch fluid reservoir bolt (FJR13AE)	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Clutch actuator bracket bolt (FJR13AE)	M8	2	19 Nm (1.9 m·kg, 13 ft·lb)	
Clutch actuator bracket bolt (FJR13AE)	M6	3	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Gear position sensor cover (FJR13AE)	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Gear position sensor screw (FJR13AE)	M5	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	LT
Gear position sensor bracket (FJR13AE)	M5	2	9 Nm (0.9 m·kg, 6.5 ft·lb)	LT
Shift actuator front bolt (FJR13AE)	M8	1	20 Nm (2.0 m·kg, 14 ft·lb)	
Shift actuator rear bolt (FJR13AE)	M8	1	20 Nm (2.0 m·kg, 14 ft·lb)	
Shift rod bolt (FJR13AE)	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	LT
Shift rod bolt (FJR13AE)	M8	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	LT
Shift rod front locknut (FJR13AE)	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Shift rod rear locknut (FJR13AE)	M8	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Foot shift switch screw (FJR13AE)	M5	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	LT
Front shift arm bolt (FJR13AE)	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	

TIP

Cylinder head bolt

Tighten the cylinder head bolts to 25 Nm (2.5 m·kg 18 ft·lb) in the proper tightening sequence, loosen and retighten the bolts to 25 Nm (2.5 m·kg 18 ft·lb) in the proper tightening sequence, and then tighten them further to reach the specified angle 175–185° in the proper tightening sequence.

TIP

Connecting rod nut

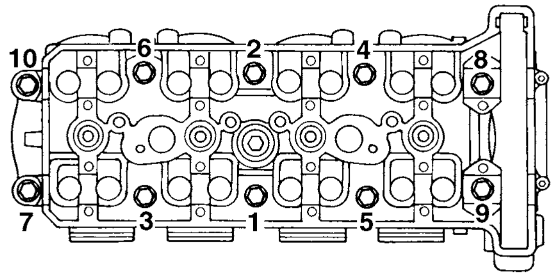
Tighten the connecting rod nuts to 20 Nm (2.0 m·kg 14 ft·lb), and then tighten them further to reach the specified angle 115–125°.

TIP

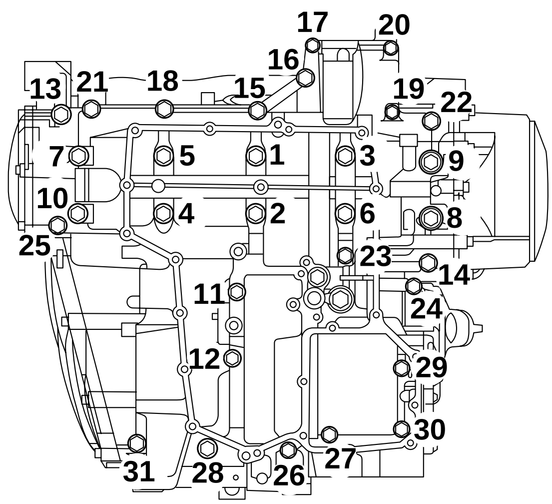
Crankcase bolt

Tighten the crankcase bolts to 20 Nm (2.0 m·kg 14 ft·lb) in the proper tightening sequence, loosen and retighten the bolts to 20 Nm (2.0 m·kg 14 ft·lb) in the proper tightening sequence, and then tighten them further to reach the specified angle 115–125° in the proper tightening sequence.

Cylinder head tightening sequence:



Crankcase tightening sequence:



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CHASSIS TIGHTENING TORQUES

Item	Thread size	Q'ty	Tightening torque	Remarks
Engine mounting bolts (right front lower side)	M12	1	49 Nm (4.9 m·kg, 35 ft·lb)	
Engine mounting bolts (right front upper side)	M12	1	49 Nm (4.9 m·kg, 35 ft·lb)	
Engine mounting bolts (left front lower side)	M12	1	49 Nm (4.9 m·kg, 35 ft·lb)	
Engine mounting bolts (left front upper side)	M12	1	49 Nm (4.9 m·kg, 35 ft·lb)	
Engine mounting nut (rear upper side)	M10	1	45 Nm (4.5 m·kg, 32 ft·lb)	E
Spacer bolt	M16	1	18 Nm (1.8 m·kg, 13 ft·lb)	
Engine mounting bolt (rear lower side)	M10	1	45 Nm (4.5 m·kg, 32 ft·lb)	E
Engine mounting bolt (left rear side)	M8	2	16 Nm (1.6 m·kg, 11 ft·lb)	
Engine bracket bolt (left rear side)	M10	1	32 Nm (3.2 m·kg, 23 ft·lb)	
Engine bracket bolt (top)	M8	4	16 Nm (1.6 m·kg, 11 ft·lb)	
Engine mounting bolt (top)	M10	2	37 Nm (3.7 m·kg, 27 ft·lb)	
Pinch bolt (front side)	M8	1	24 Nm (2.4 m·kg, 17 ft·lb)	
Pinch bolt (rear side)	M8	2	24 Nm (2.4 m·kg, 17 ft·lb)	
Pivot shaft	M28	1	23 Nm (2.3 m·kg, 17 ft·lb)	LS
Pivot shaft nut	M18	1	125 Nm (12.5 m·kg, 90 ft·lb)	
Pivot shaft locknut	M28	1	115 Nm (11.5 m·kg, 85 ft·lb)	
Pivot shaft locknut retainer bolt (FJR13A)	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Pivot shaft locknut retainer bolt (FJR13AE)	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	LT
Relay arm and frame nut	M10	1	40 Nm (4.0 m·kg, 29 ft·lb)	
Connecting arm and relay arm nut	M10	1	48 Nm (4.8 m·kg, 35 ft·lb)	
Connecting arm and swingarm nut	M10	1	48 Nm (4.8 m·kg, 35 ft·lb)	
Rear shock absorber assembly upper nut	M12	1	64 Nm (6.4 m·kg, 46 ft·lb)	
Rear shock absorber assembly lower nut	M10	1	40 Nm (4.0 m·kg, 29 ft·lb)	
Rear shock absorber spring preload adjusting lever nut	M6	3	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Upper bracket pinch bolt	M8	2	26 Nm (2.6 m·kg, 19 ft·lb)	
Lower bracket pinch bolt	M8	4	23 Nm (2.3 m·kg, 17 ft·lb)	
Steering stem nut	M28	1	115 Nm (11.5 m·kg, 85 ft·lb)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Lower ring nut (initial tightening torque)	M30	1	52 Nm (5.2 m·kg, 37 ft·lb)	See NOTE.
Lower ring nut (final tightening torque)	M30	1	18 Nm (1.8 m·kg, 13 ft·lb)	See NOTE.
Handlebar bolt	M8	2	23 Nm (2.3 m·kg, 17 ft·lb)	
Handlebar nut	M12	2	65 Nm (6.5 m·kg, 47 ft·lb)	
Clutch master cylinder holder bolt (FJR13A)	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Front brake master cylinder holder bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Front fork cap bolt locknut	M10	1	25 Nm (2.5 m·kg, 18 ft·lb)	
Front fork damper rod assembly bolt	M10	1	35 Nm (3.5 m·kg, 25 ft·lb)	LT
Front fork cap bolt	M45	1	25 Nm (2.5 m·kg, 18 ft·lb)	LS
Front fender bolt	M6	4	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Brake hose joint bracket bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Lower bracket cover bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Front cowling stay and frame nut	M10	2	32 Nm (3.2 m·kg, 23 ft·lb)	
Front cowling assembly bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Windshield inner bracket and windshield drive unit bolt	M6	4	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rearview mirror nut	M6	4	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Windshield drive unit bolt	M6	4	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Windshield drive unit side rail bolt	M6	6	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Side cover bolt	M6	3	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Grab bar bolt	M8	5	21 Nm (2.1 m·kg, 15 ft·lb)	
Grab bar bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Fuel pump bolt	M5	6	4 Nm (0.4 m·kg, 2.9 ft·lb)	
Front fuel tank bracket and frame bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Fuel tank and front fuel tank bracket bolt	M8	2	16 Nm (1.6 m·kg, 11 ft·lb)	
Fuel tank and rear upper fuel tank bracket bolt	M8	2	16 Nm (1.6 m·kg, 11 ft·lb)	
Rear upper fuel tank bracket and rear lower fuel tank bracket nut	M8	1	16 Nm (1.6 m·kg, 11 ft·lb)	
Rear lower fuel tank bracket and frame bolt	M6	4	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Fuel tank cap bolt	M5	3	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Canister bolt (for California only)	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Canister bracket bolt (for California only)	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Storage compartment bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
T-bar bolt	M10	3	37 Nm (3.7 m·kg, 27 ft·lb)	
Rear fender bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear fender nut	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Front wheel axle bolt	M14	1	91 Nm (9.1 m·kg, 66 ft·lb)	See NOTE.
Front wheel axle pinch bolt	M8	4	21 Nm (2.1 m·kg, 15 ft·lb)	
Front brake disc bolt	M6	12	18 Nm (1.8 m·kg, 13 ft·lb)	LT
Front wheel sensor bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Front wheel sensor rotor bolt	M5	3	8 Nm (0.8 m·kg, 5.8 ft·lb)	LT
Rear wheel axle nut	M18	1	125 Nm (12.5 m·kg, 90 ft·lb)	
Rear wheel axle pinch bolt	M8	1	23 Nm (2.3 m·kg, 17 ft·lb)	
Rear brake disc bolt	M6	6	18 Nm (1.8 m·kg, 13 ft·lb)	LT
Rear wheel sensor bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear wheel sensor rotor bolt	M5	3	8 Nm (0.8 m·kg, 5.8 ft·lb)	LT
Brake torque rod nut	M8	2	30 Nm (3.0 m·kg, 22 ft·lb)	
Rear wheel dust cover screw	M5	3	5 Nm (0.5 m·kg, 3.6 ft·lb)	LT
Rear wheel bearing retainer	M56	1	80 Nm (8.0 m·kg, 58 ft·lb)	LT Left-hand threads.
Brake hose union bolt	M10	11	30 Nm (3.0 m·kg, 22 ft·lb)	
Brake pipe flare nut	M10	5	16 Nm (1.6 m·kg, 11 ft·lb)	
Brake pipe/joint assembly flare nut	M10	3	16 Nm (1.6 m·kg, 11 ft·lb)	
Brake pipe/joint assembly bolt	M6	3	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Front brake caliper bolt	M10	4	40 Nm (4.0 m·kg, 29 ft·lb)	
Front brake hose holder bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Front brake caliper bleed screw	M8	3	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Front brake pad bolt	M10	4	17 Nm (1.7 m·kg, 12 ft·lb)	
Rear brake caliper bolt	M10	2	27 Nm (2.7 m·kg, 19 ft·lb)	S
Rear brake hose/rear wheel sensor lead holder bolt	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear brake hose holder bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Rear brake caliper bleed screw	M7	1	6 Nm (0.6 m·kg, 4.3 ft·lb)	
Hydraulic unit assembly nut	M8	3	16 Nm (1.6 m·kg, 11 ft·lb)	
Hydraulic unit assembly bracket and hydraulic unit assembly bolt	M6	5	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Metering valve bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Proportioning valve bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Sidestand nut	M10	1	58 Nm (5.8 m·kg, 42 ft·lb)	

Item	Thread size	Q'ty	Tightening torque	Remarks
Sidestand switch screw	M5	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	LT
Centerstand nut	M10	4	55 Nm (5.5 m·kg, 40 ft·lb)	
Centerstand bracket nut	M10	2	55 Nm (5.5 m·kg, 40 ft·lb)	
Brake pedal bolt	M6	1	8 Nm (0.8 m·kg, 5.8 ft·lb)	
Right footrest bracket bolt	M8	2	28 Nm (2.8 m·kg, 20 ft·lb)	
Rear brake master cylinder bolt	M8	2	18 Nm (1.8 m·kg, 13 ft·lb)	
Rear brake master cylinder locknut	M8	1	16 Nm (1.6 m·kg, 11 ft·lb)	
Left footrest assembly bolt	M8	2	28 Nm (2.8 m·kg, 20 ft·lb)	
Left footrest assembly bolt	M10	1	49 Nm (4.9 m·kg, 35 ft·lb)	
Left footrest assembly/sidestand bolt	M10	2	65 Nm (6.5 m·kg, 47 ft·lb)	LT
Shift arm pinch bolt (FJR13A)	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Shift rod locknut (FJR13A)	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Drive shaft dust cover bolt	M5	2	4 Nm (0.4 m·kg, 2.9 ft·lb)	LT
Final gear oil drain bolt	M14	1	23 Nm (2.3 m·kg, 17 ft·lb)	
Final gear oil filler bolt	M14	1	23 Nm (2.3 m·kg, 17 ft·lb)	
Final drive assembly nut	M10	4	42 Nm (4.2 m·kg, 30 ft·lb)	
Final drive pinion gear bearing retainer	M65	1	110 Nm (11.0 m·kg, 80 ft·lb)	Left-hand thread
Coupling gear nut	M16	1	110 Nm (11.0 m·kg, 80 ft·lb)	Stake
Ring gear bearing housing bolt	M10	2	40 Nm (4.0 m·kg, 29 ft·lb)	
Ring gear bearing housing nut	M8	6	23 Nm (2.3 m·kg, 17 ft·lb)	
Final gear case stud bolt	M8	6	9 Nm (0.9 m·kg, 6.5 ft·lb)	
Ring gear bearing housing stopper bolt	M10	1	9 Nm (0.9 m·kg, 6.5 ft·lb)	LT Left-hand thread
Battery box bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Battery stay bolt	M6	2	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Battery holder bolt	M6	1	10 Nm (1.0 m·kg, 7.2 ft·lb)	
Horn bolt	M6	2	7 Nm (0.7 m·kg, 5.1 ft·lb)	
Shift pedal bolt (FJR13AE)	M6	1	7 Nm (0.7 m·kg, 5.1 ft·lb)	LT
Shift pedal pivot bolt (FJR13AE)	M8	1	16 Nm (1.6 m·kg, 11 ft·lb)	LT

TIP

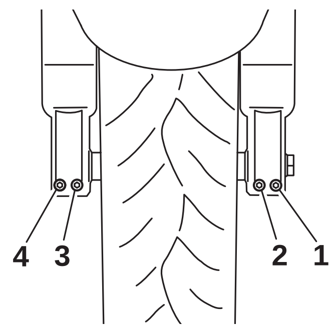
Lower ring nut

1. First, tighten the lower ring nut to approximately 52 Nm (5.2 m·kg, 37 ft·lb) with a torque wrench, then loosen the lower ring nut completely.
2. Retighten the lower ring nut to 18 Nm (1.8 m·kg, 13 ft·lb) with a torque wrench.

TIP

Front wheel axle pinch bolt

1. Insert the front wheel axle from the right side and tighten it with the flange bolt from the left side to 91 Nm (9.1 m·kg, 66 ft·lb).
2. In the order pinch bolt “2” → pinch bolt “1” → pinch bolt “2”, tighten each bolt to 21 Nm (2.1 m·kg, 15 ft·lb) without performing temporary tightening.
3. Check that the right end of the front axle is flush with the front fork. If necessary, manually push the front axle or lightly tap it with a soft hammer until its end is flush with the front fork. However, if the surface of the front axle end is not parallel to the surface of the front fork, align a point on the outer edge of the axle with the fork, making sure that the axle does not protrude past the fork.
4. In the order pinch bolt “4” → pinch bolt “3” → pinch bolt “4”, tighten each bolt to 21 Nm (2.1 m·kg, 15 ft·lb) without performing temporary tightening.



EAS20360
LUBRICATION POINTS AND LUBRICANT TYPES

EAS20370
ENGINE

Lubrication point	Lubricant
Oil seal lips	LS
O-rings	LS
Bearings	E
Crankshaft pins	E
Piston surfaces	E
Piston pins	E
Connecting rod bolts and nuts	M
Crankshaft journals	E
Camshaft lobes	M
Camshaft journals	M
Balancer absorbers, weights, gears and shafts	E
Valve stems (intake and exhaust)	M
Valve stem ends (intake and exhaust)	E
Water pump impeller shaft	E
Oil pump rotors (inner and outer) and oil pump shaft	E
Oil pump drive sprocket	E
Oil strainer	E
Oil nozzle (O-ring)	LS
Starter clutch idle gear inner surface	E
Starter clutch assembly	E
Primary driven gear	E
Push rods and ball	LS
Transmission gears (wheel and pinion)	M
Main axle and drive axle	M
Shift drum	E
Shift forks and shift fork guide bars	E
Shift shaft	E
Shift pedal bolt	LS
Damper drive cam and damper driven cam	M
Middle driven gear	M
Middle drive pinion gear	E
Middle driven pinion gear	E
Middle drive pinion gear nut	E

Lubrication point	Lubricant
Cylinder head cover mating surface	Three Bond 1541®
Cylinder head cover gasket	Yamaha bond No.1215 (Three Bond No.1215®)
Crankcase mating surface	Yamaha bond No.1215 (Three Bond No.1215®)
Crankshaft position sensor lead grommet	Yamaha bond No.1215 (Three Bond No.1215®)
Stator coil assembly lead grommet	Yamaha bond No.1215 (Three Bond No.1215®)

EAS20380

CHASSIS

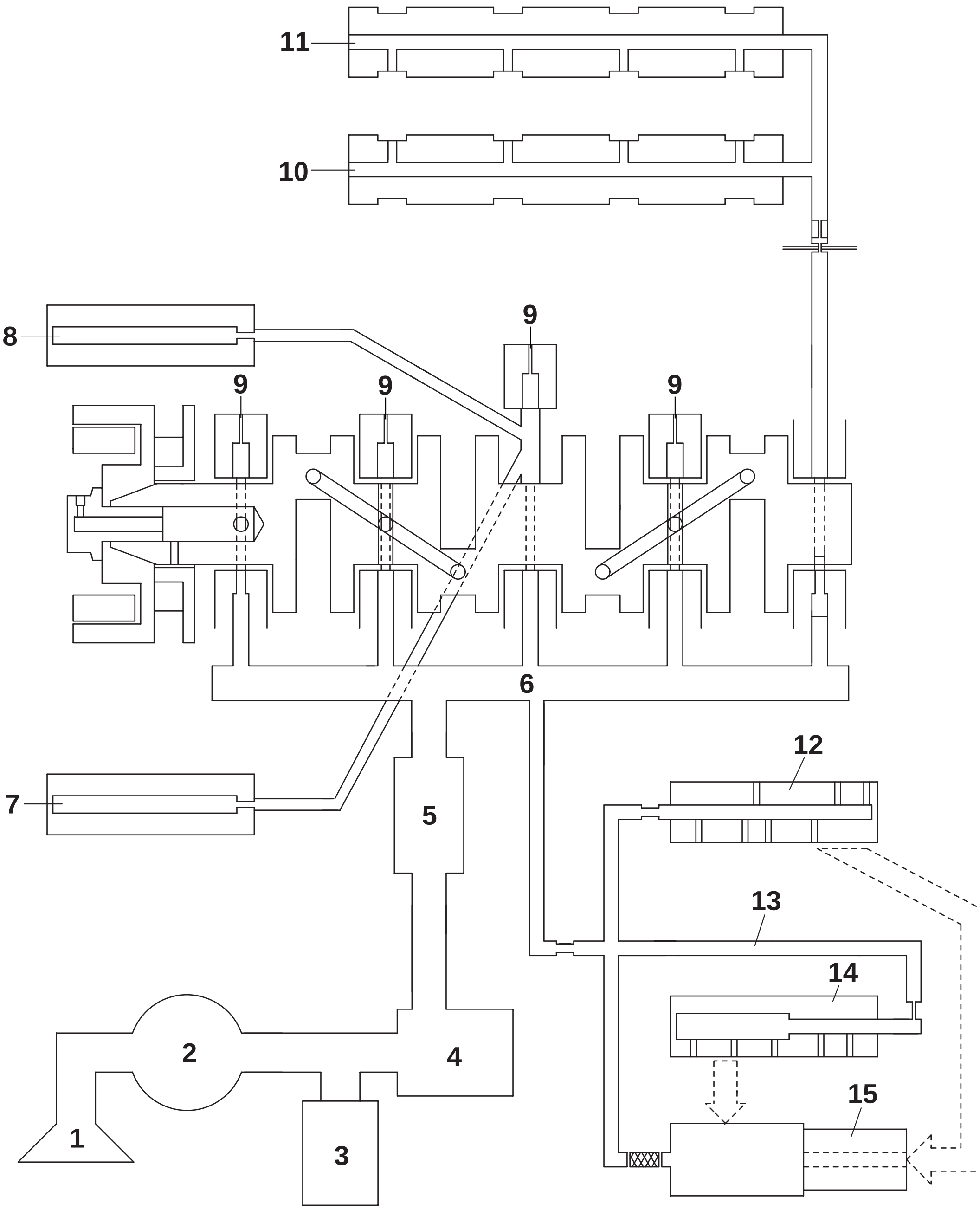
Lubrication point	Lubricant
Steering bearings and upper bearing cover lip	LS
Lower bearing dust seal lip	LS
Front wheel oil seal lips (right and left)	LS
Rear wheel oil seal lips	LS
Rear wheel drive hub oil seal	LS
Rear wheel drive hub mating surface	LS
Rear brake pedal pivoting point	LS
Footrest assembly pivoting point	LS
Shift pedal pivoting point	LS
Centerstand pivoting point and metal-to-metal moving parts	LS
Sidestand pivoting point and metal-to-metal moving parts	LS
Tube guide (throttle grip) inner surface and throttle cables	LS
Brake lever pivot bolt and metal-to-metal moving parts	S
Clutch lever pivot bolt and metal-to-metal moving parts (FJR13A)	S
Rear shock absorber assembly oil seal	LS
Rear shock absorber assembly bearing	LS
Rear shock absorber assembly spacer	LS
Pivot shaft and pivot shaft thread	LS
Pivot shaft bearing	LS
Pivot shaft oil seal lip	LS
Relay arm bearing	LS
Oil seals (rear shock absorber, relay arm and connecting arm)	LS
Drive shaft spline (final drive pinion gear side)	M
Drive shaft spline (universal joint side)	M
Ring gear inner surface	LS
Thrust washer (ring gear)	E
Bearing (ring gear)	LS
Bearing (final drive pinion gear)	LS

EAS20390

LUBRICATION SYSTEM CHART AND DIAGRAMS

EAS20400

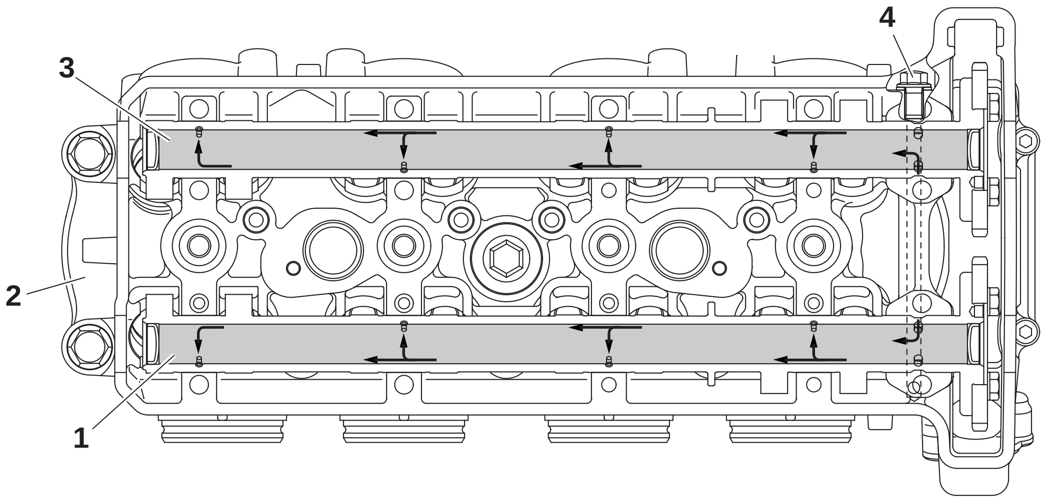
ENGINE OIL LUBRICATION CHART

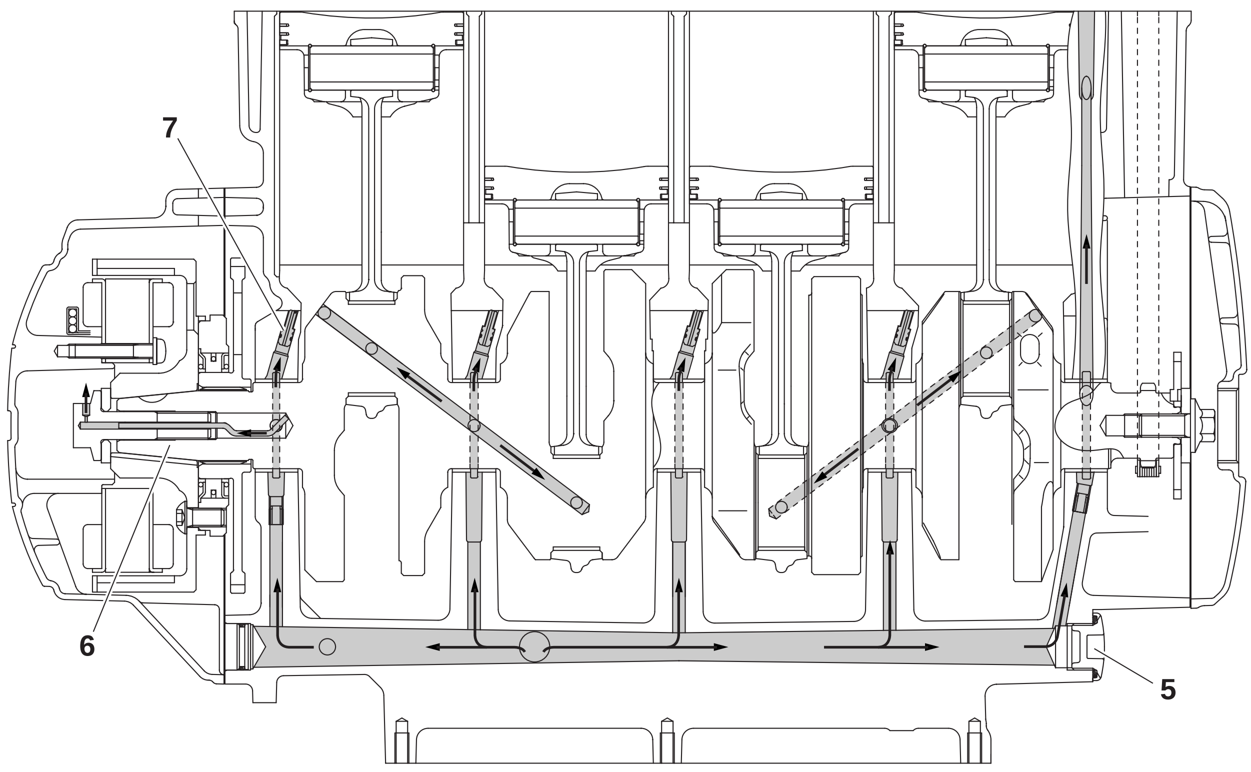


1. Oil strainer
2. Oil pump
3. Relief valve assembly
4. Oil filter
5. Oil cooler
6. Main gallery
7. Front balancer shaft
8. Rear balancer shaft
9. Oil nozzle
10. Intake camshaft
11. Exhaust camshaft
12. Main axle
13. Oil pipe
14. Drive axle
15. Middle drive shaft assembly

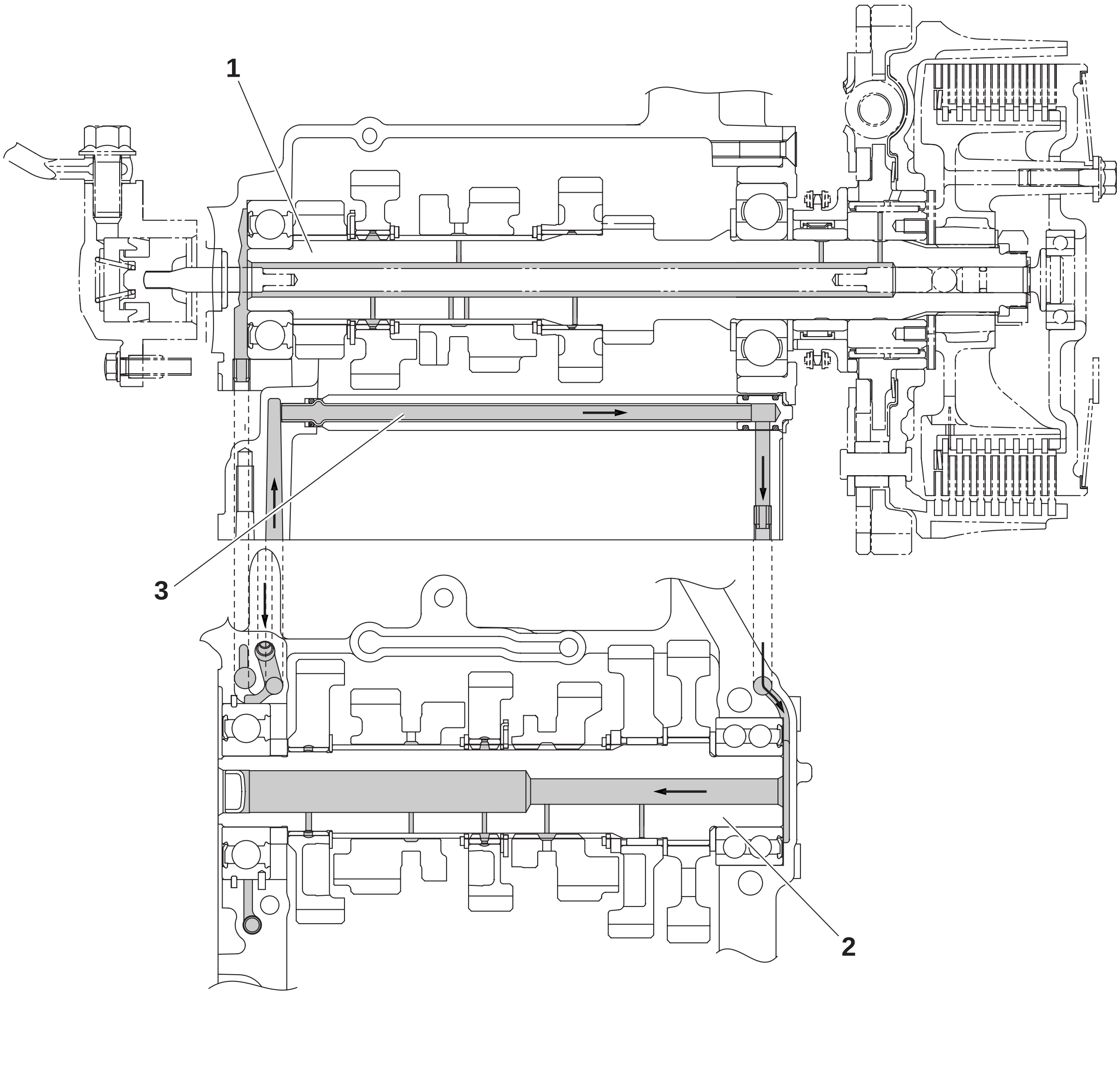
EAS20410

LUBRICATION DIAGRAMS

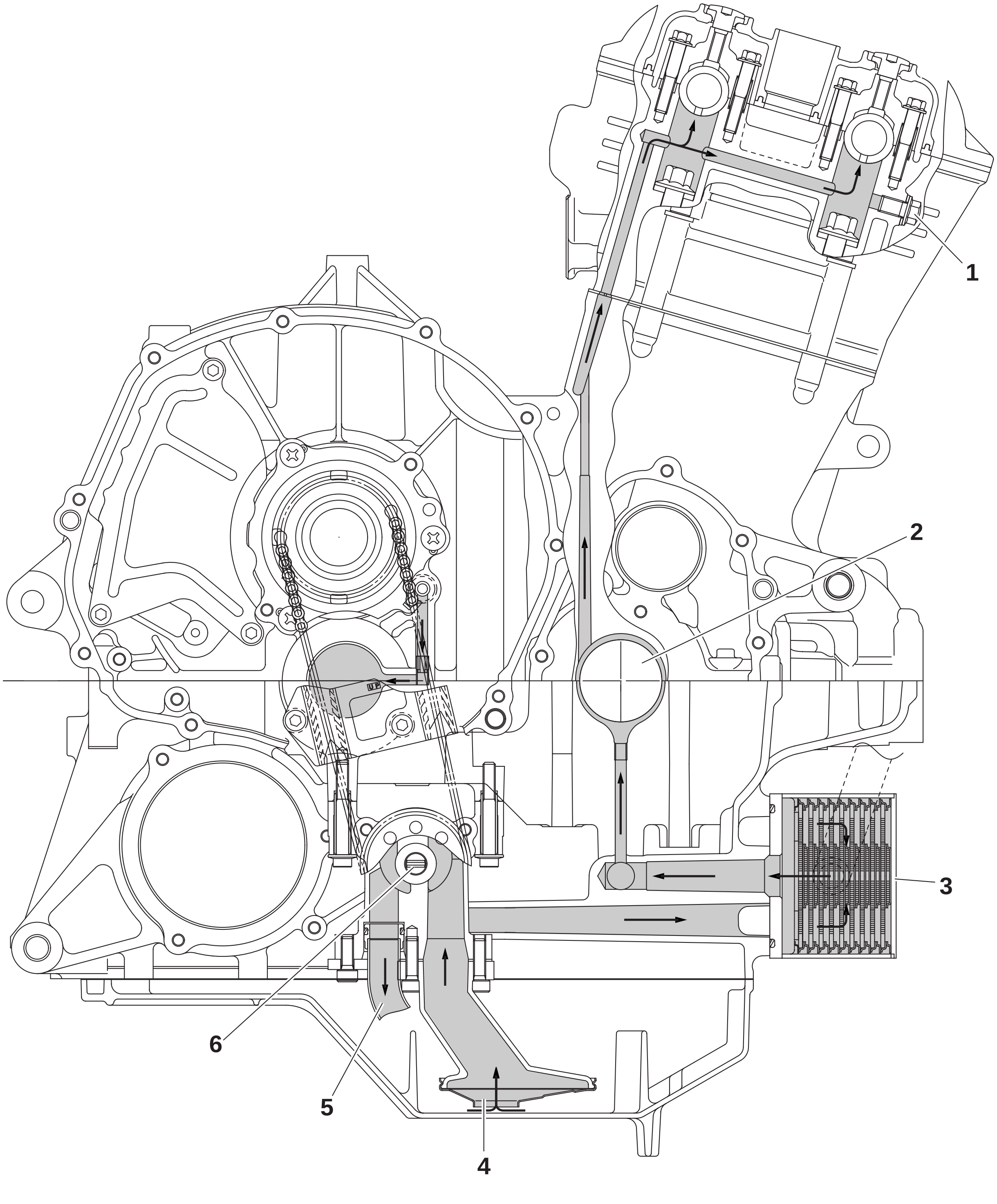




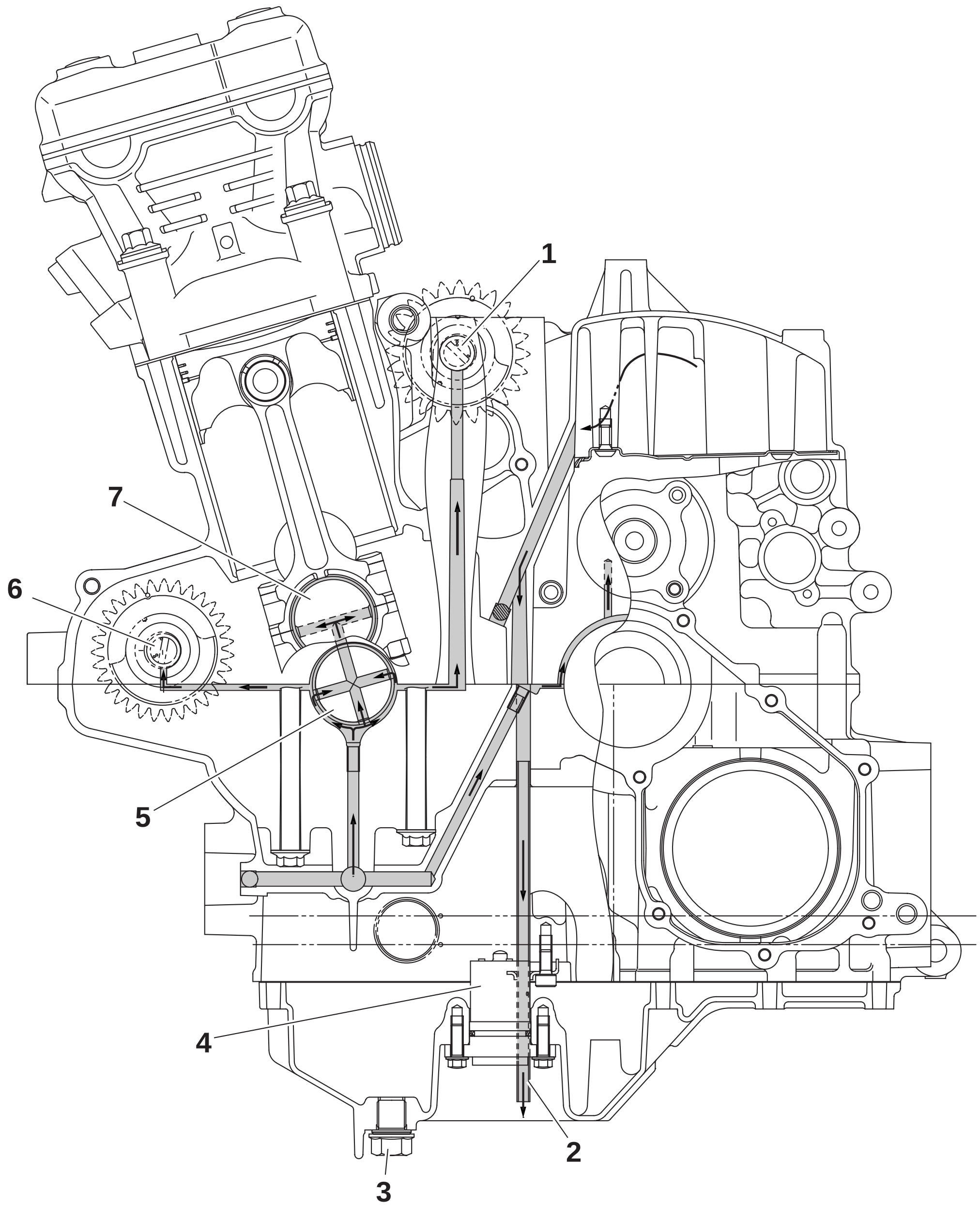
1. Intake camshaft
2. Cylinder head
3. Exhaust camshaft
4. Oil check bolt
5. Main gallery bolt
6. Crankshaft
7. Oil nozzle

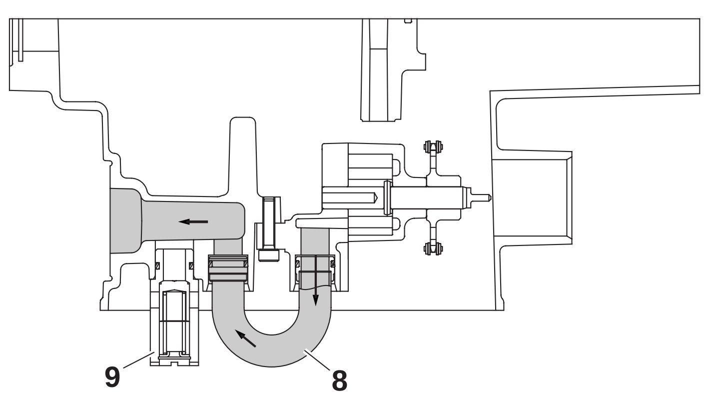

1
3
2

1. Main axle
2. Drive axle
3. Oil delivery pipe 1

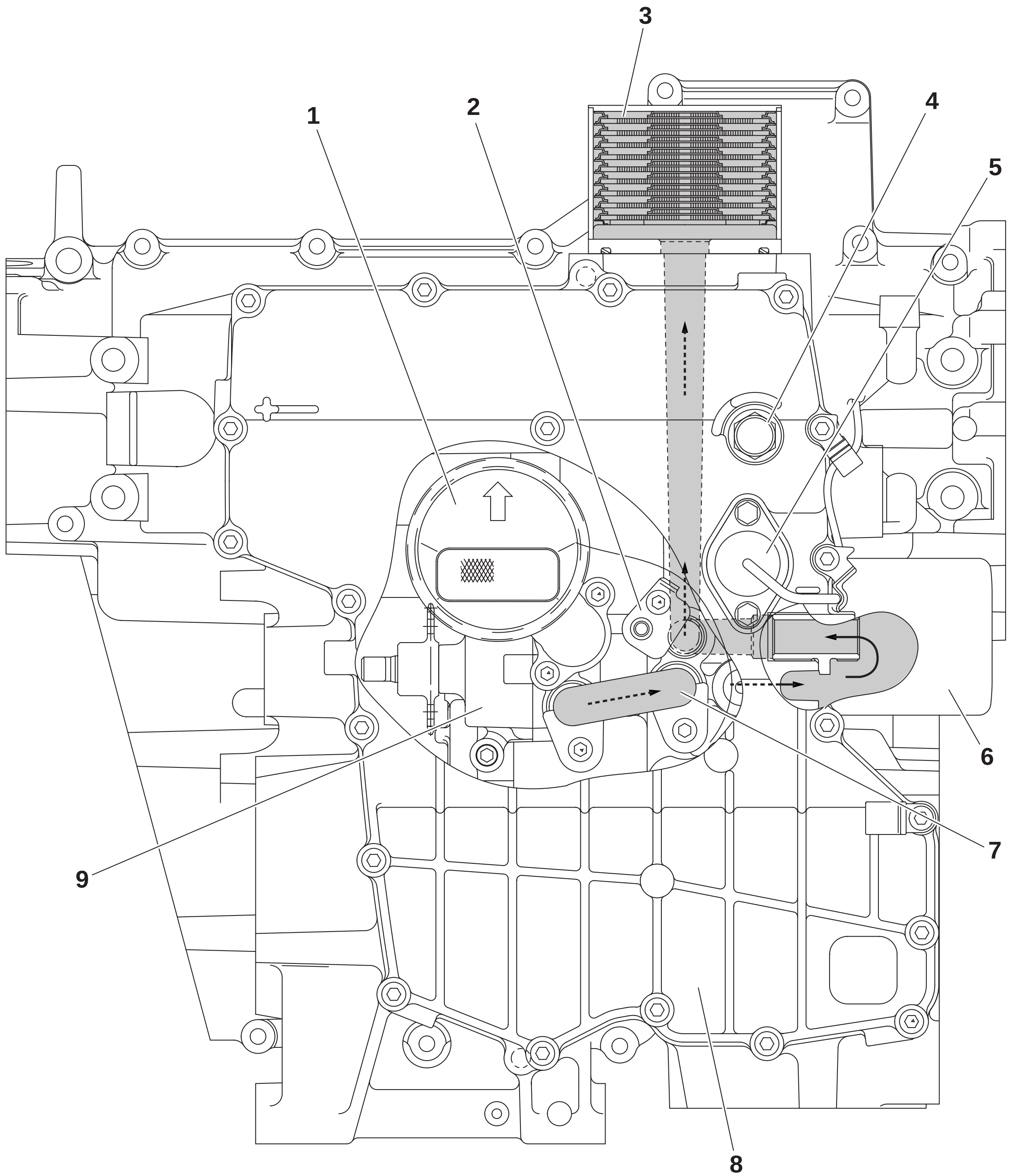

1
2
3
4
5
6
UP

1. Oil check bolt
2. Crankshaft
3. Oil cooler
4. Oil strainer
5. Oil delivery pipe 3
6. Oil pump


1
7
6
5
4
2
3


9
8

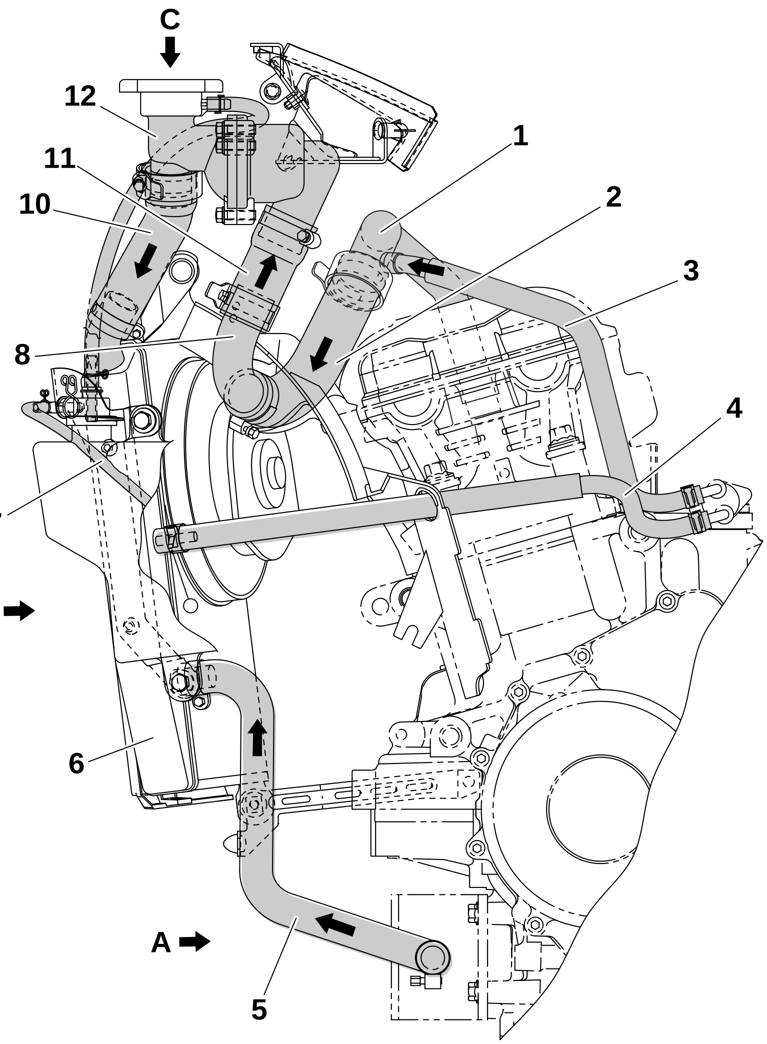
1. Rear balancer
2. Oil delivery pipe 2
3. Engine oil drain bolt
4. Oil level switch
5. Crankshaft
6. Front balancer
7. Crank pin
8. Oil delivery pipe 3
9. Relief valve assembly

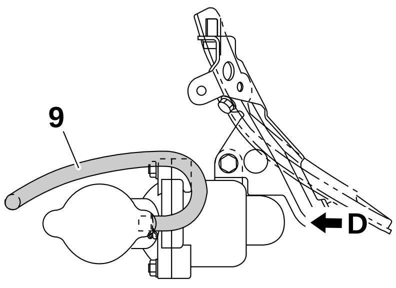

3
1
2
4
5
6
7
9
8

1. Oil strainer
2. Oil delivery pipe 2
3. Oil cooler
4. Engine oil drain bolt
5. Oil level switch
6. Oil filter cartridge
7. Oil delivery pipe 3
8. Oil pan
9. Oil pump

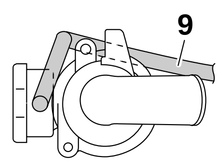
EAS20420

COOLING SYSTEM DIAGRAMS

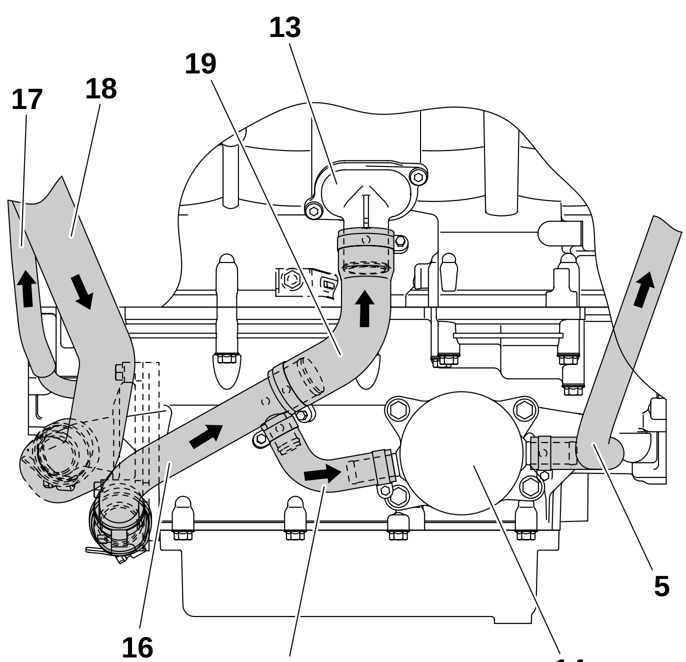




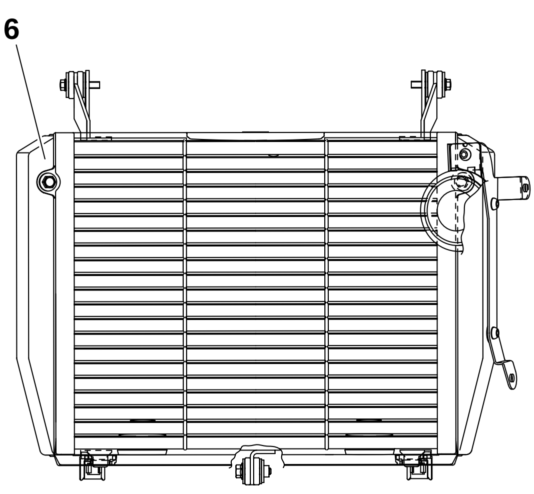
C



D

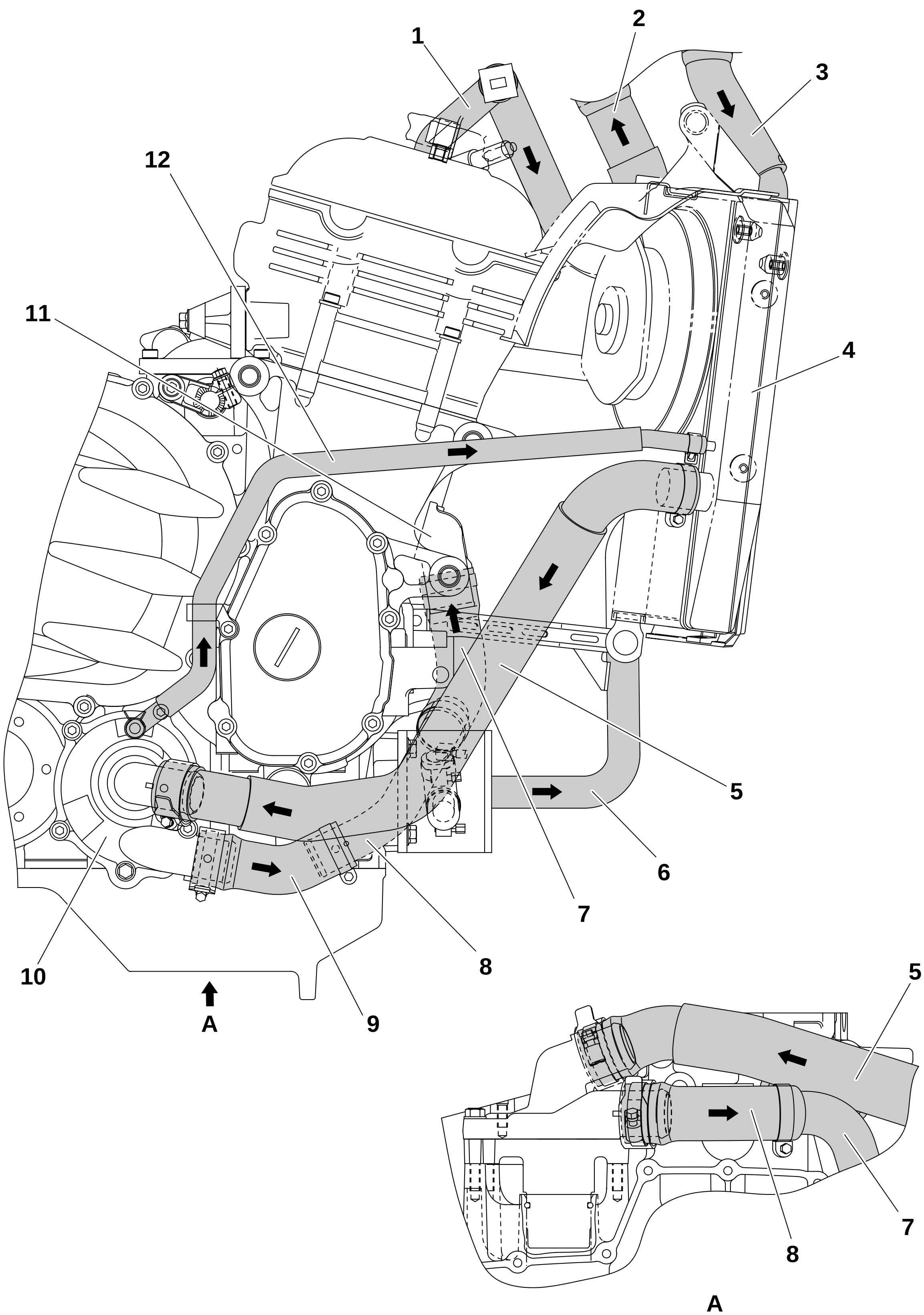


A



B

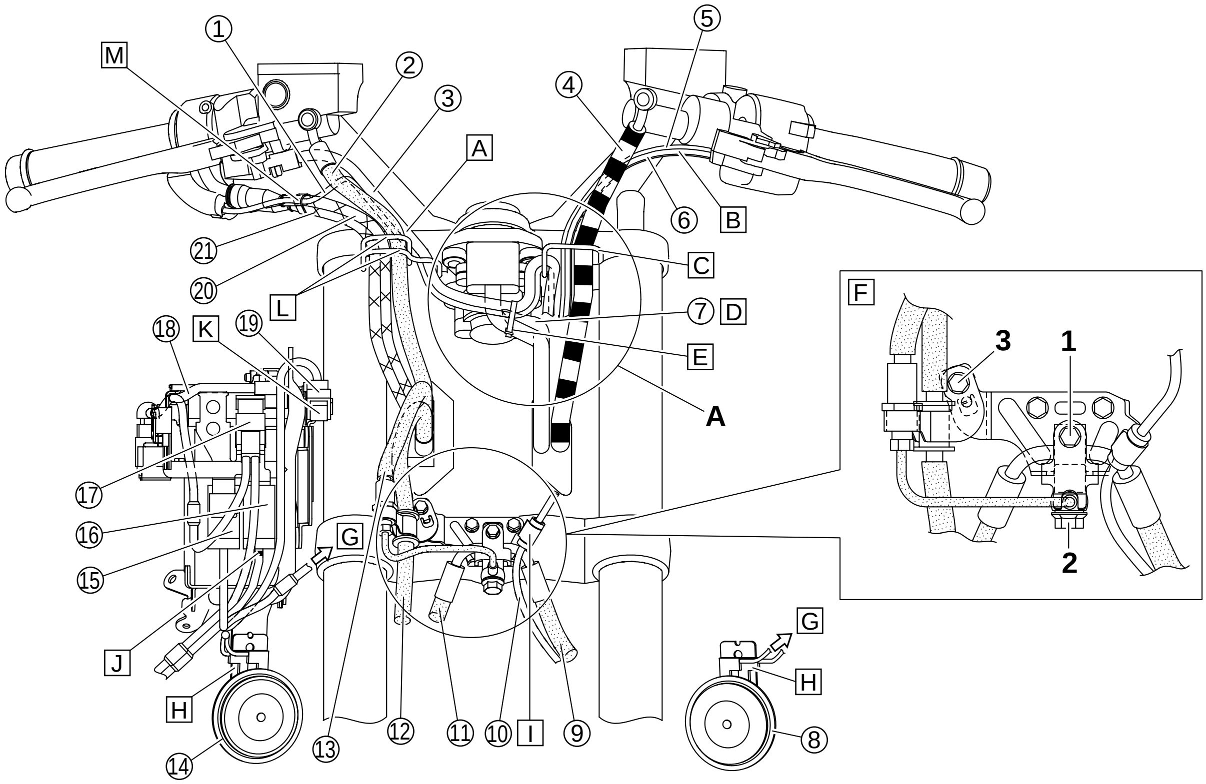
1. Thermostat inlet pipe 1
2. Thermostat inlet hose 1
3. Plunger control unit hose 1
4. Plunger control unit hose 2
5. Oil cooler outlet hose
6. Radiator
7. Coolant reservoir breather hose
8. Thermostat inlet pipe 2
9. Coolant reservoir hose
10. Radiator inlet hose
11. Thermostat inlet hose 2
12. Thermostat assembly
13. Water jacket joint
14. Oil cooler
15. Oil cooler inlet hose
16. Water pump outlet pipe
17. Water pump breather hose
18. Radiator outlet hose
19. Water jacket joint inlet hose

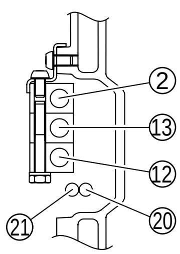

1
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12
A
5
7
8
A

1. Thermostat inlet pipe 1
2. Thermostat inlet hose 2
3. Radiator inlet hose
4. Radiator
5. Radiator outlet hose
6. Oil cooler outlet hose
7. Water jacket joint inlet hose
8. Water pump outlet pipe
9. Water pump outlet hose
10. Water pump
11. Water jacket joint
12. Water pump breather hose

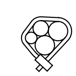
EAS20430

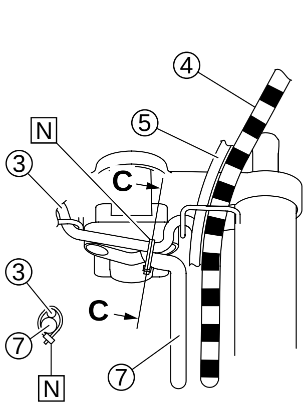
CABLE ROUTING (FJR13A)



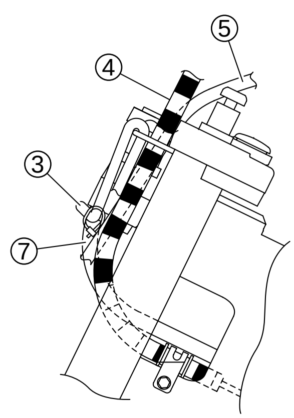


B-B

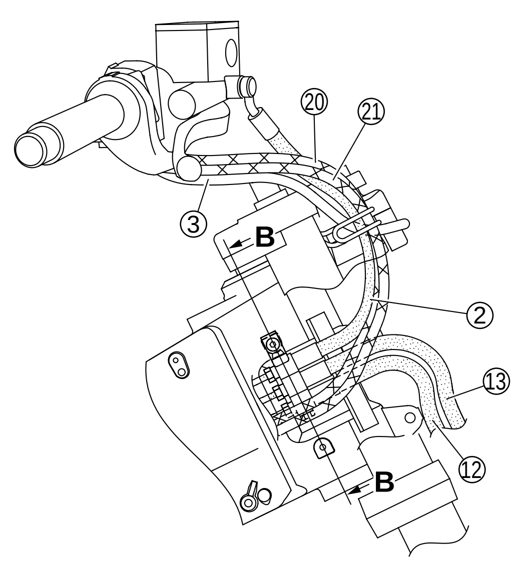




C-C

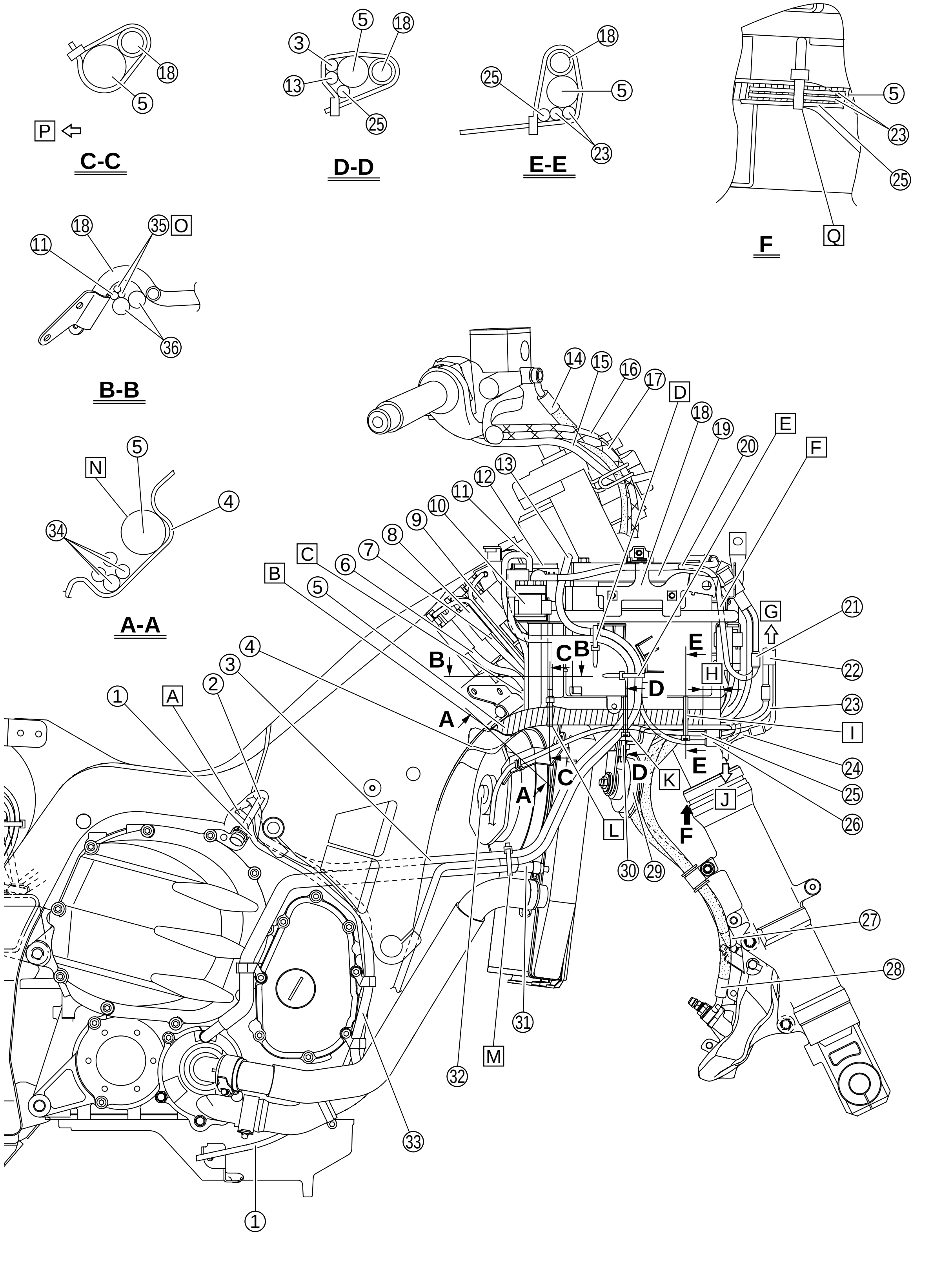


A



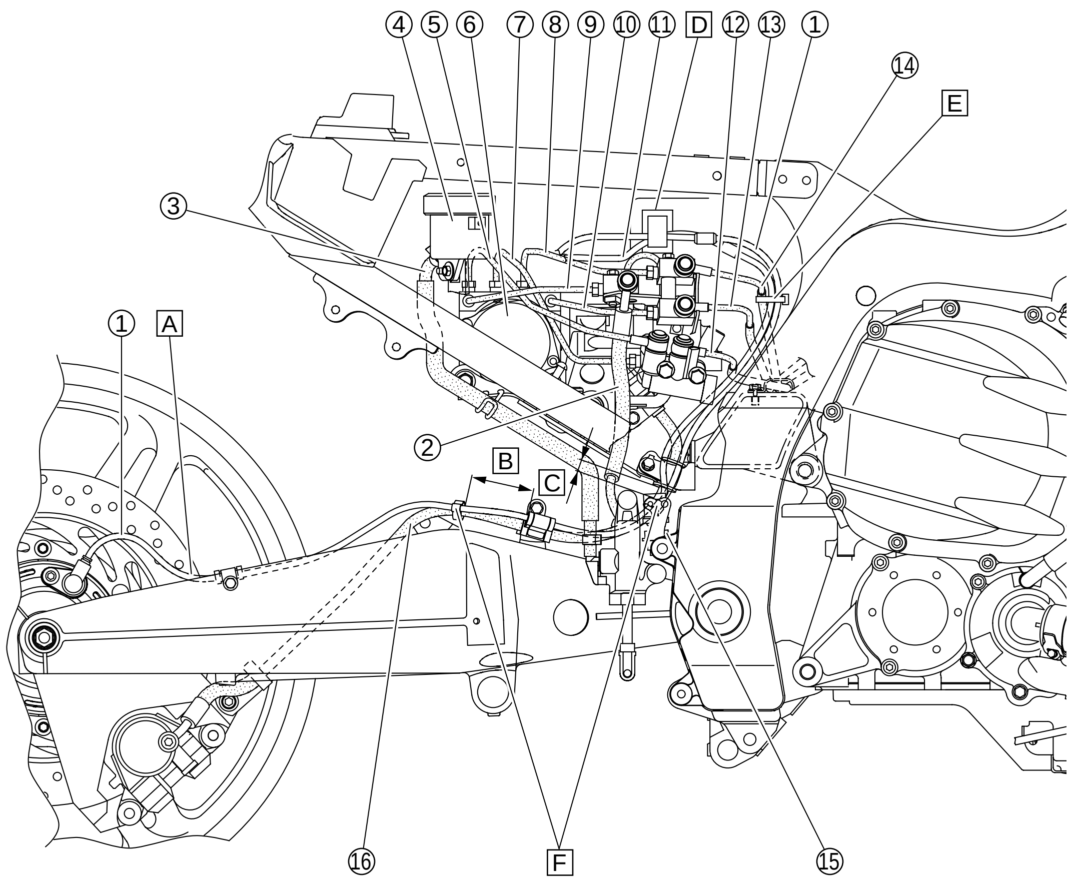
1. Right grip warmer lead (for optional grip warmer)
2. Brake hose (front brake master cylinder to brake pipe/lower joint assembly)
3. Right handlebar switch lead
4. Clutch hose
5. Left handlebar switch lead
6. Left grip warmer lead (for optional grip warmer)
7. Main switch lead
8. Left horn (low)
9. Brake hose (brake pipe/upper joint assembly to left front brake caliper)
10. Front wheel sensor lead
11. Brake hose (brake pipe/upper joint assembly to right front brake caliper)
12. Brake hose (metering valve to right front brake caliper)
13. Brake hose (brake pipe/upper joint assembly to front brake calipers)
14. Right horn (high)
15. Headlight (on/off)/grip warmer relay
16. Radiator fan motor relay
17. Main fuse
18. Positive battery lead
19. ABS test coupler
20. Throttle cable (accelerator cable)
21. Throttle cable (decelerator cable)

A. Route the right handlebar switch lead and right grip warmer lead under the handlebar.
B. Route the left handlebar switch lead and left grip warmer lead under the handlebar.
C. Pass the clutch hose, right handlebar switch lead, left handlebar switch lead, right grip warmer lead, and left grip warmer lead through the guide.
D. Route the main switch lead to the inside of the clutch hose.
E. Fasten the right handlebar switch lead, right grip warmer lead, and main switch lead with a plastic locking tie. Face the end of the plastic locking tie downward, angled inward, and then cut off the excess end of the tie.
F. Temporarily tighten the brake hose joint bolt, union bolt, and brake hose holder bolt in the proper tightening sequence as shown. Then, tighten the bolts to the specified torques, making sure to tighten the brake hose joint bolt “1” last.
G. To front cowling wire harness
H. Install the horn L-shaped connectors so that the leads are routed outward.
I. Fasten the grommet on the front wheel sensor lead with the holder.
J. Connect the coupler that has blue tape wrapped around its leads to the radiator fan motor relay.
K. Install the ABS test coupler completely onto the tab on the battery stay.
L. Pass the brake hose (front brake master cylinder to brake pipe/lower joint assembly), right handlebar switch lead, right grip warmer lead, and throttle cables through the guide as shown in the illustration.
M. Fasten the right grip warmer lead to the throttle cables with a plastic locking tie 10 mm (0.39 in) or less from the end of the throttle cable boot. Face the end of the plastic locking tie upward or downward, and then cut off the excess end of the tie.
N. Fasten the main switch lead and right handlebar switch lead with a plastic locking tie at the location shown in the illustration. Position the buckle of the plastic locking tie under the leads, with the end facing inward, and then cut off the excess end of the tie.


C-C
D-D
E-E
F
B-B
A-A
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1. O_2 sensor lead
2. Engine idling speed adjusting cable
3. Starter motor lead
4. Air deflector
5. Wire harness
6. Spark plug lead #4
7. Spark plug lead #1
8. Cylinders-#1/#4 ignition coil
9. Cylinders-#2/#3 ignition coil
10. Starter relay
11. Starter relay lead
12. Fuse box 2
13. Negative battery lead
14. Brake hose (front brake master cylinder to brake pipe/lower joint assembly)
15. Right handlebar switch lead
16. Throttle cable (accelerator cable)
17. Throttle cable (decelerator cable)
18. Battery stay
19. Battery
20. Positive battery lead
21. Positive battery lead coupler
22. Front cowling wire harness
23. Right horn (high) leads
24. Front right turn signal/position light lead
25. Right radiator fan motor lead
26. Ground lead coupler
27. Brake hose (brake pipe/upper joint assembly to right front brake caliper)
28. Brake hose (metering valve to right front brake caliper)
29. Right horn (high)
30. Right horn (high) connectors
31. Water pump breather hose
32. Right radiator fan
33. Crankshaft position sensor lead
34. Spark plug leads
35. Ignition coil primary leads
36. Fuse box leads

A. Route the O_2 sensor lead to the inside of the engine idling speed adjusting cable.
B. Make sure that the wire harness and spark plug leads are positioned in the indentation on the right side of the air deflector.
C. Route the spark plug leads to the inside of the battery stay pipe.
D. Fasten the negative battery lead at the blue tape and the starter motor lead to the battery box with a plastic locking tie. Face the end of the plastic locking tie downward. Do not cut off the excess end of the plastic locking tie.
E. Fasten the negative battery lead and starter motor lead to the battery box with a plastic locking tie. Face the end of the plastic locking tie rearward. Do not cut off the excess end of the plastic locking tie.
F. Route the positive battery lead between the battery stay and the battery box.
G. To front cowling wire harness
H. Align the rear end of the right radiator fan motor coupler with the tape on the wire harness as shown in the illustration.
I. Fasten the wire harness, right horn (high) leads, and right radiator fan motor lead with a plastic locking tie, making sure to install the tie on the fan motor lead's protective sleeve. Face the end of the plastic locking tie outward. Do not cut off the excess end of the plastic locking tie.
J. To front right turn signal/position light
K. Fasten the wire harness, right radiator fan motor lead, negative battery lead, and starter motor lead to the battery stay with a plastic locking tie, making sure to install the tie on the fan motor lead's protective sleeve and to position the tie in front of the air deflector. Face the end of the plastic locking tie outward, and then cut off the excess end of the tie.
L. Fasten the wire harness to the battery stay with a plastic locking tie. Face the end of the plastic locking tie upward, and then cut off the excess end of the tie.
M. Fasten the negative battery lead at the blue tape, starter motor lead, and water pump breather hose with a plastic locking tie, making sure to install the tie around the end of the hose's protective sleeve, and then cut off the excess end of the tie. Do not kink the water pump breather hose and do not face the end of the plastic locking tie downward.
N. Route the wire harness to the outside of the spark plug leads.
O. Route the ignition coil primary leads to the inside of the fuse box leads.
P. Outside of frame
Q. Position the plastic locking tie to the rear of the bend in the battery stay.



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1. Rear wheel sensor lead
2. Brake hose (rear brake master cylinder to brake pipe/middle joint assembly)
3. Rear brake fluid reservoir hose
4. Rear brake fluid reservoir
5. Brake pipe (hydraulic unit to metering valve)
6. Hydraulic unit assembly
7. Brake pipe (hydraulic unit to proportioning valve)
8. Brake pipe/upper joint assembly
9. Brake pipe/middle joint assembly
10. Brake pipe/lower joint assembly
11. Rear brake light switch lead
12. Brake pipe (metering valve to right front brake caliper)
13. Brake pipe (front brake master cylinder to brake pipe/lower joint assembly)
14. Brake pipe (brake pipe/upper joint assembly to front brake calipers)
15. Rear brake light switch
16. Brake hose (brake pipe to rear brake caliper)

A. Route the rear wheel sensor lead to the inside of the swingarm, making sure that the lead does not protrude above the swingarm.

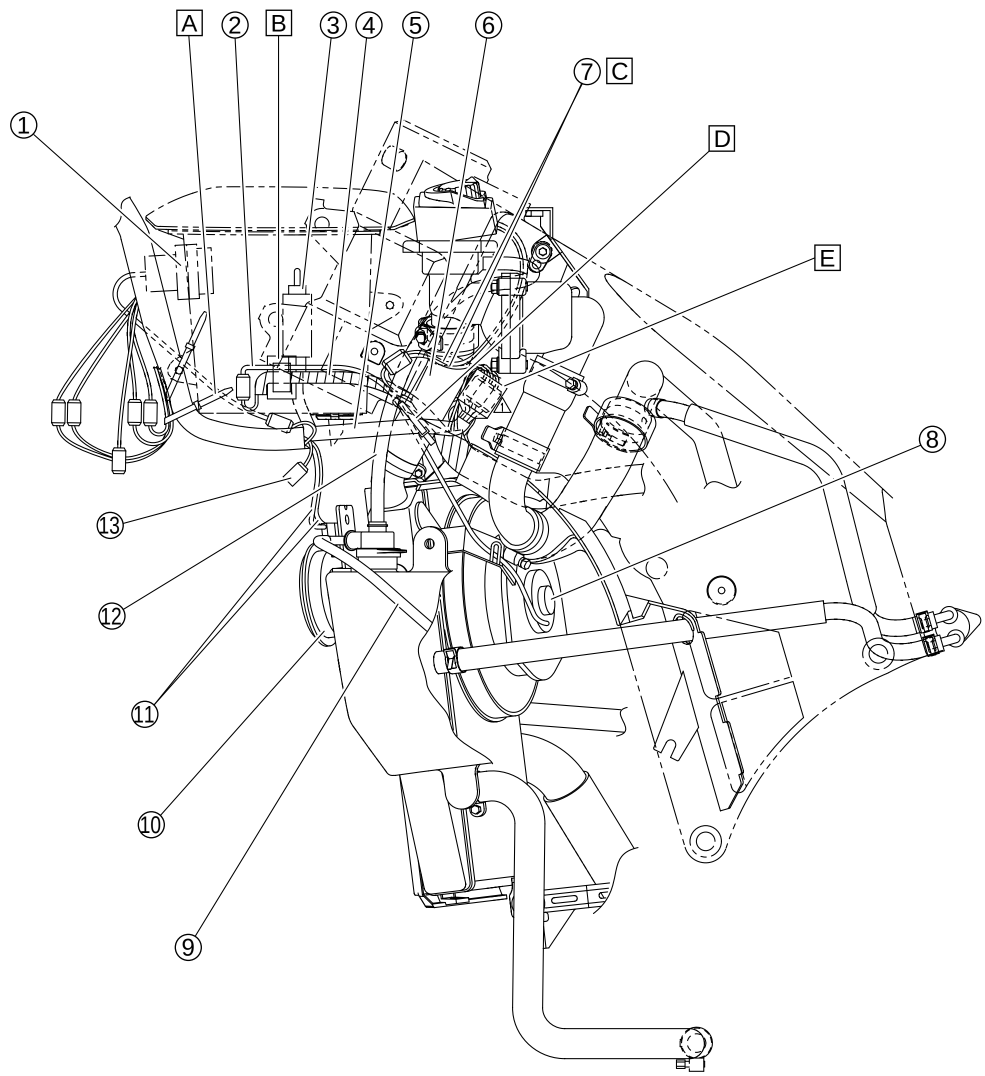
B. 45–55 mm (1.77–2.17 in)

C. 20–30 mm (0.79–1.18 in)

D. Fasten the rear brake light switch lead and rear wheel sensor lead with the holder.

E. Fasten the brake pipe (brake pipe/upper joint assembly to front brake calipers), rear wheel sensor lead, and rear brake light switch lead with a plastic locking tie. Face the end of the plastic locking tie inward.

F. Fasten the rear wheel sensor lead to the brake hose (brake pipe to rear brake caliper) with the two holders, making sure that the fastener of each holder faces inward.


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1. Auxiliary DC jack
2. Left radiator fan motor lead
3. Accessory box solenoid
4. Wire harness
5. Front cowling wire harness
6. Radiator inlet hose
7. Grip warmer control unit leads (for optional grip warmer)
8. Left radiator fan
9. Coolant reservoir breather hose
10. Left horn (low)
11. Left horn (low) leads
12. Coolant reservoir hose
13. Joint coupler

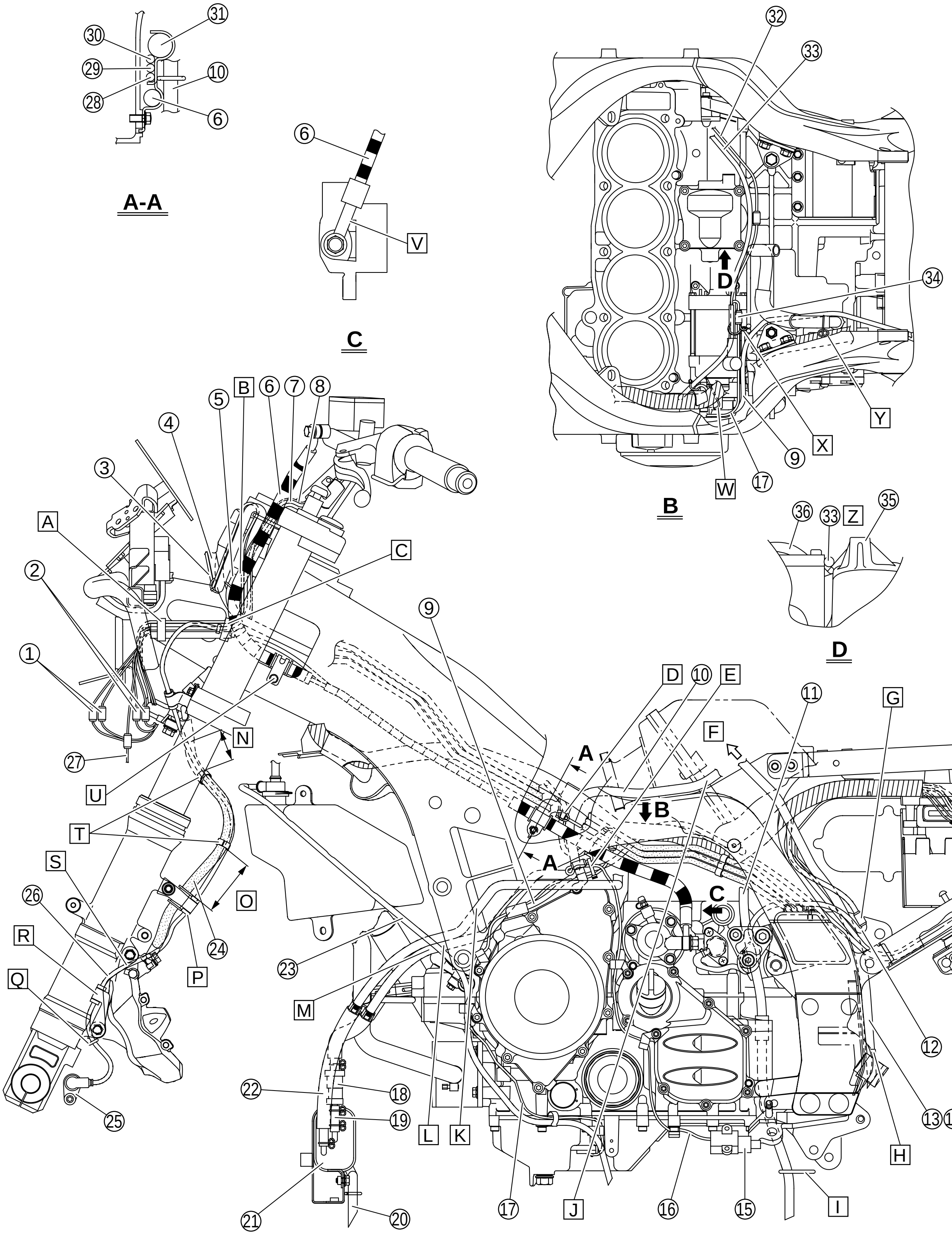
A. Fasten the handlebar switch leads and grip warmer leads to the front cowling wire harness with a plastic locking tie. Face the end of the plastic locking tie rearward, along the side of the accessory box. Do not cut off the excess end of the plastic locking tie.

B. Fasten the wire harness and left radiator fan motor lead with the holder.

C. Route the grip warmer control unit leads to the front of the coolant reservoir hose.

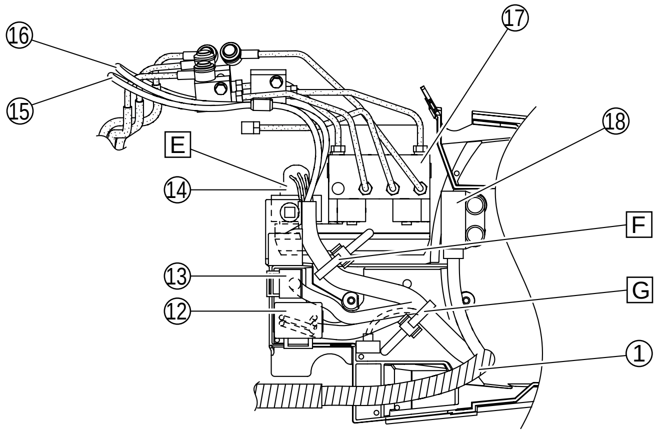
D. Fasten the front cowling wire harness to the radiator inlet hose with a plastic locking tie, making sure to install the tie on the harness' protective sleeve. Face the end of the plastic locking tie upward. Do not cut off the excess end of the plastic locking tie.

E. After connecting the couplers, cover them completely with the cover, and then push them in between the radiator inlet hose and the thermostat inlet hose 2.

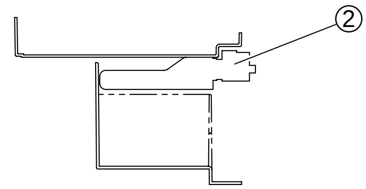

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1. Grip warmer couplers (for optional grip warmers)
2. Handlebar switch couplers
3. Right grip warmer lead (for optional grip warmer)
4. Right handlebar switch lead
5. Main switch lead
6. Clutch hose
7. Left grip warmer lead (for optional grip warmer)
8. Left handlebar switch lead
9. Stator coil lead
10. Fuel tank breather hose (joint to rollover valve) (for California only)
11. Air filter case breather hose
12. Gear position switch lead
13. Fuel tank breather/overflow hose (except for California)
14. Fuel tank overflow hose (for California only)
15. Sidestand switch
16. Sidestand switch lead
17. Oil level switch lead
18. Rollover valve (for California only)
19. Fuel tank breather hose (rollover valve to canister) (for California only)
20. Canister breather hose (for California only)
21. Canister (for California only)
22. Canister purge hose (3-way joint to canister) (for California only)
23. Coolant reservoir breather hose
24. Brake hose (brake pipe/upper joint assembly to left front brake caliper)
25. Front wheel sensor
26. Front wheel sensor lead
27. Front left turn signal/position light lead
28. Brake pipe (metering valve to right front brake caliper)
29. Brake pipe (brake pipe/upper joint assembly to front brake calipers)
30. Brake pipe (front brake master cylinder to brake pipe/lower joint assembly)
31. Wire harness
32. Crankshaft position sensor lead
33. Starter motor lead
34. Oil level switch coupler
35. Upper crankcase
36. Rear balancer cover

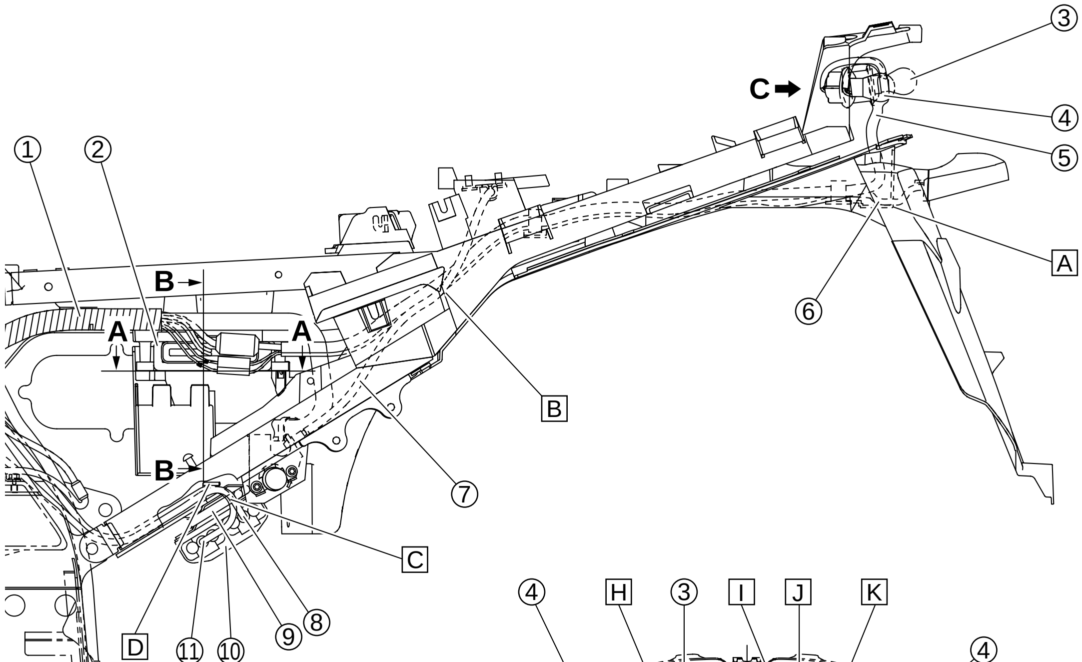
A. Secure the plastic band by inserting the projection on the band into the hole in the windshield drive unit/meter assembly stay, and then fasten the handlebar switch leads and grip warmer leads with the band, making sure that the end of the band faces down. Do not cut off the excess end of the plastic band.
B. Route the clutch hose in front of the front fork as shown in the illustration.
C. Secure the plastic band by inserting the projection on the band into the hole in the windshield drive unit/meter assembly stay, and then fasten the handlebar switch leads, front wheel sensor lead, and grip warmer leads with the band, making sure that the end of the band faces down. Do not cut off the excess end of the plastic band.
D. Fasten the leads (to oil level switch and crankshaft position sensor) that branch off from the wire harness to the guide on the holder with a plastic locking tie, making sure that the end of the tie faces upward. Do not cut off the excess end of the plastic locking tie.
E. Fasten the sidestand switch lead, stator coil lead, and oil level switch lead with a plastic locking tie, making sure to bundle and fasten the sidestand switch lead so that the coupler is positioned to the front of the tie. Face the end of the plastic locking tie outward. Do not cut off the excess end of the plastic locking tie.
F. To fuel tank
G. Route the gear position switch lead so that the coupler is positioned as shown in the illustration.
H. Pass the fuel tank breather/overflow hose through the guide on the universal joint dust cover.
I. Pass the air filter case breather hose through the guide on the muffler bracket.
J. Pass the fuel tank breather hose (joint to rollover valve) between the frame and the projection on the air filter case as shown in the illustration. (for California only)
K. Pass the canister purge hose (3-way joint to canister) through the opening in the frame, to the inside of the frame. (for California only)
L. Pass the fuel tank breather hose (joint to rollover valve) through the cutout in the air deflector. (for California only)
M. Route the coolant reservoir breather hose to the outside of the fuel tank breather hose (joint to rollover valve) and the canister purge hose (3-way joint to canister). (for California only)
N. 43–53 mm (1.69–2.09 in)
O. 60–70 mm (2.36–2.76 in)
P. Fasten the grommets on the front wheel sensor lead and the brake hose (brake pipe/upper joint assembly to left front brake caliper) with the holder.
Q. Pass the front wheel sensor lead through the guide.
R. Fasten the grommet on the front wheel sensor lead with the holder.
S. Route the front wheel sensor lead between the left front brake caliper and the brake hose (brake pipe/upper joint assembly to left front brake caliper).
T. Fasten the front wheel sensor lead to the brake hose (brake pipe/upper joint assembly to left front brake caliper) with the two holders, making sure to position the lead to the inside of the hose.
U. Fasten the clutch hose with the holder.
V. When installing the clutch hose onto the clutch release cylinder, make sure that the pipe section on the end of the hose contacts the stopper on the cylinder body.
W. To sidestand switch
X. Fasten the oil level switch lead and starter motor lead with the clamp.
Y. Face the ends of the clamp to the left, making sure that the lower end contacts the wire harness.
Z. Route the starter motor lead between the rear balancer cover bolt and the rib on the crankcase.

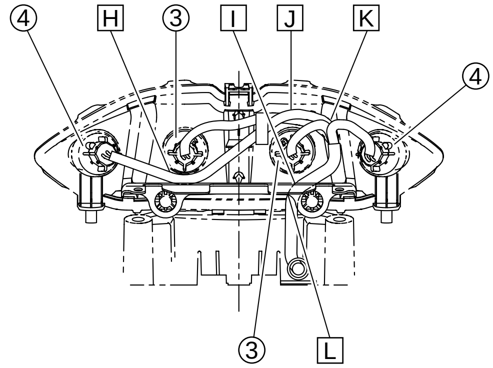


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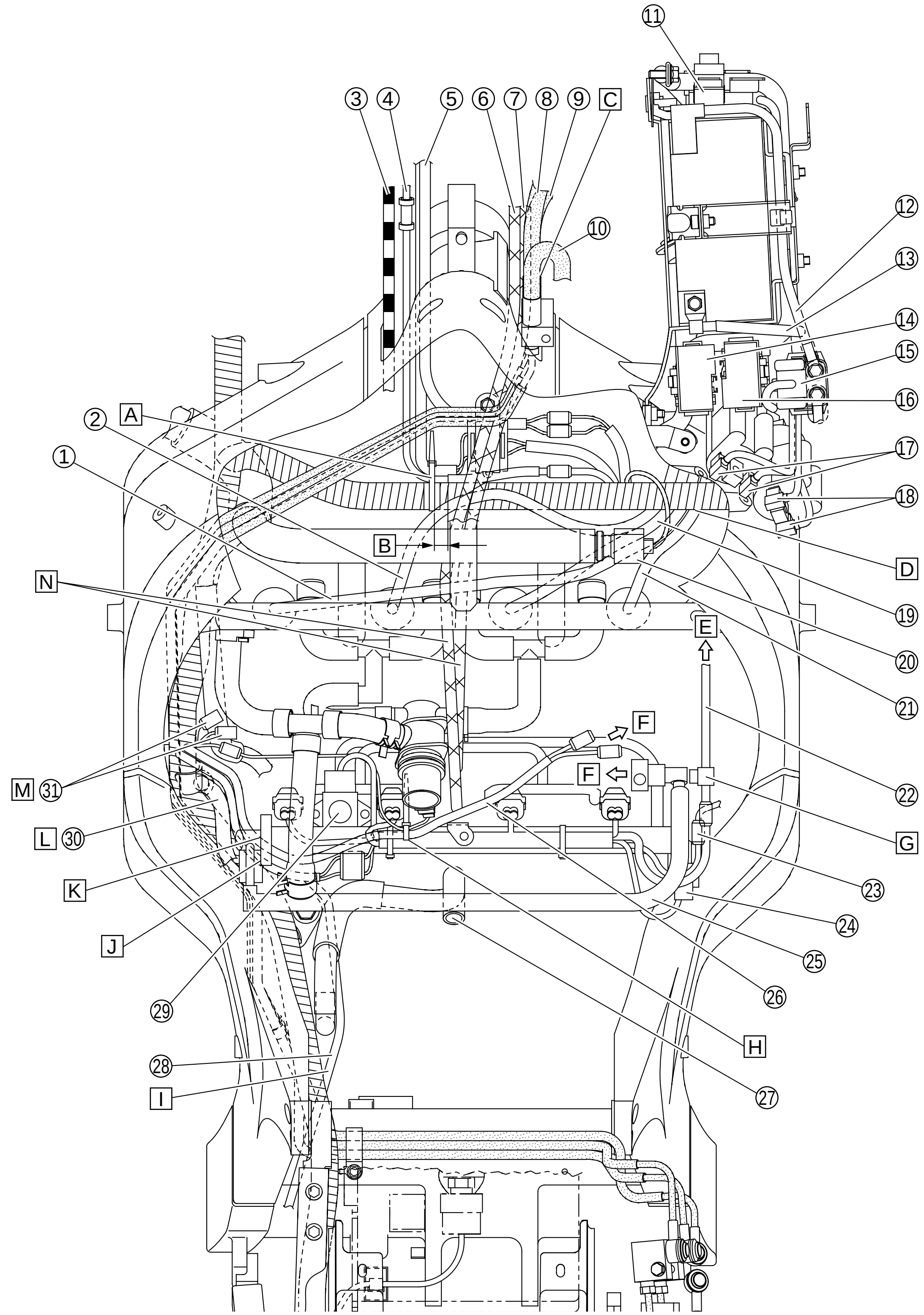




C

1. Wire harness
2. ECU (engine control unit)
3. Tail/brake light
4. Rear turn signal light
5. Tail/brake light assembly lead
6. License plate light lead
7. Seat lock cable
8. Stator coil lead
9. Rear shock absorber spring preload adjusting cable
10. Rectifier/regulator
11. Rectifier/regulator lead
12. Relay unit
13. Brake light relay
14. ABS ECU coupler
15. Rear wheel sensor lead
16. Rear brake light switch lead
17. Hydraulic unit assembly
18. Lean angle sensor

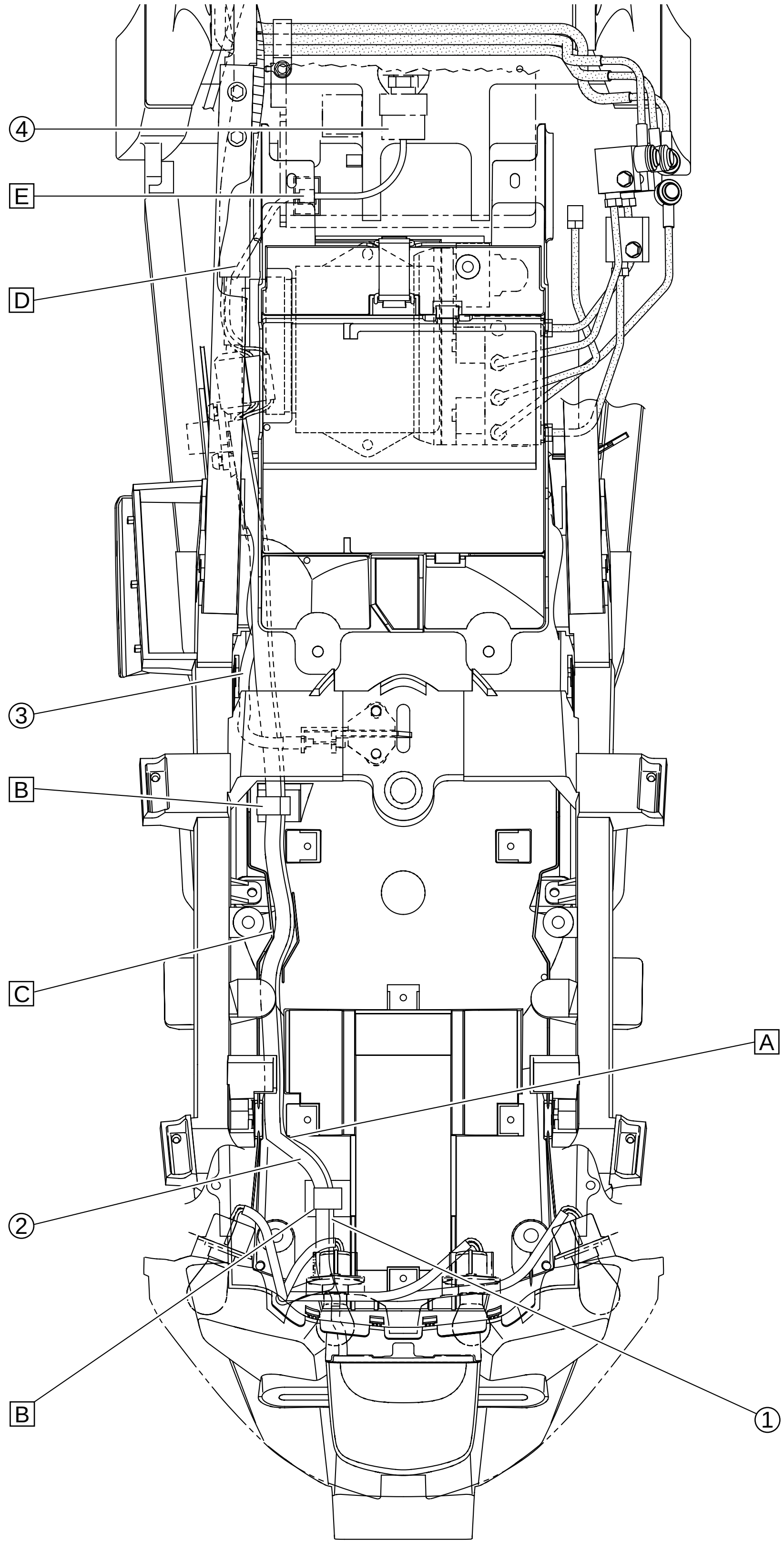
A. Pass the license plate light lead through the hole in the rear fender.
B. Route the wire harness to the inside of the seat lock cable.
C. Route the stator coil lead and rectifier/regulator lead to the outside of the rear shock absorber spring preload adjusting cable.
D. Pass the stator coil lead and rectifier/regulator lead through the guide on the frame.
E. Securely connect the ABS ECU coupler.
F. Secure the plastic band by inserting the projection on the band into the hole in the rear fender, and then fasten the wire harness at the positioning tape with the band.
G. Secure the plastic band by inserting the projection on the band into the hole in the rear fender, and then fasten the wire harness with the band.
H. Route the rear right turn signal light lead under the right tail/brake light bulb socket.
I. Route the tail/brake light assembly lead between the left tail/brake light bulb socket and the mounting boss on the tail/brake light assembly.
J. Route the rear right turn signal light lead and right tail/brake light lead over the left tail/brake light bulb socket.
K. Route the leads between the left tail/brake light bulb socket and the rear left turn signal light bulb socket.
L. Route the tail/brake light assembly lead between the tail/brake light assembly and its bracket.



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1. Spark plug lead #1
2. Spark plug lead #2
3. Clutch hose
4. Front wheel sensor lead
5. Main switch lead
6. Throttle cable (accelerator cable)
7. Throttle cable (decelerator cable)
8. Brake hose (brake pipe/upper joint assembly to front brake calipers)
9. Brake hose (metering valve to right front brake caliper)
10. Brake hose (front brake master cylinder to brake pipe/lower joint assembly)
11. Main fuse
12. Positive battery lead
13. Negative battery lead
14. Fuse box 1 (identified by blue tape on lead)
15. Starter relay
16. Fuse box 2
17. Cylinders-#2/#3 ignition coil connectors (white)
18. Cylinders-#1/#4 ignition coil connectors (black)
19. Spark plug lead #3
20. Coolant temperature sensor
21. Spark plug lead #4
22. Cylinder identification sensor lead
23. O_2 sensor coupler
24. Throttle position sensor
25. Fuel hose
26. Fuel pump/fuel sender lead
27. Crankcase breather hose
28. Stator coil lead
29. Intake air pressure sensor
30. Fuel tank breather hose (joint to rollover valve) (for California only)
31. Joint couplers

A. Fasten the front wheel sensor lead to the wire harness with a plastic locking tie, making sure to align the tie with the white tape on the harness. Face the end of the plastic locking tie forward. Do not cut off the excess end of the plastic locking tie.
B. Position the plastic locking tie 0–20 mm (0–0.79 in) from the end of the protective sleeve of the front wheel sensor lead.
C. Route the throttle cables and brake hoses through the right opening in the frame.
D. Route the wire harness over the spark plug leads.
E. To cylinder identification sensor
F. To fuel tank
G. Fasten the cylinder identification sensor lead with the holder on the throttle body.
H. Fasten the fuel pump/fuel sender lead and air induction system solenoid lead with a plastic locking tie, making sure that the end of the tie faces forward. Do not cut off the excess end of the plastic locking tie.
I. Route the stator coil lead to the inside of the engine bracket (top) and under the crankcase breather hose.
J. Route the wire harness (to sub-wire harness) under the fuel hose connector.
K. Route the fuel pump/fuel sender lead under the fuel hose connector.
L. Route the fuel tank breather hose (joint to rollover valve) next to the wire harness and pass it through the guide. (for California only)
M. Place the joint couplers in the area shown in the illustration, making sure that they do not protrude above the wire harness.
N. Route the throttle cables over the main switch lead, spark plug lead #2, and wire harness, and under spark plug lead #1.



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1. License plate light lead
2. Tail/brake light assembly lead
3. Seat lock cable
4. Intake air temperature sensor

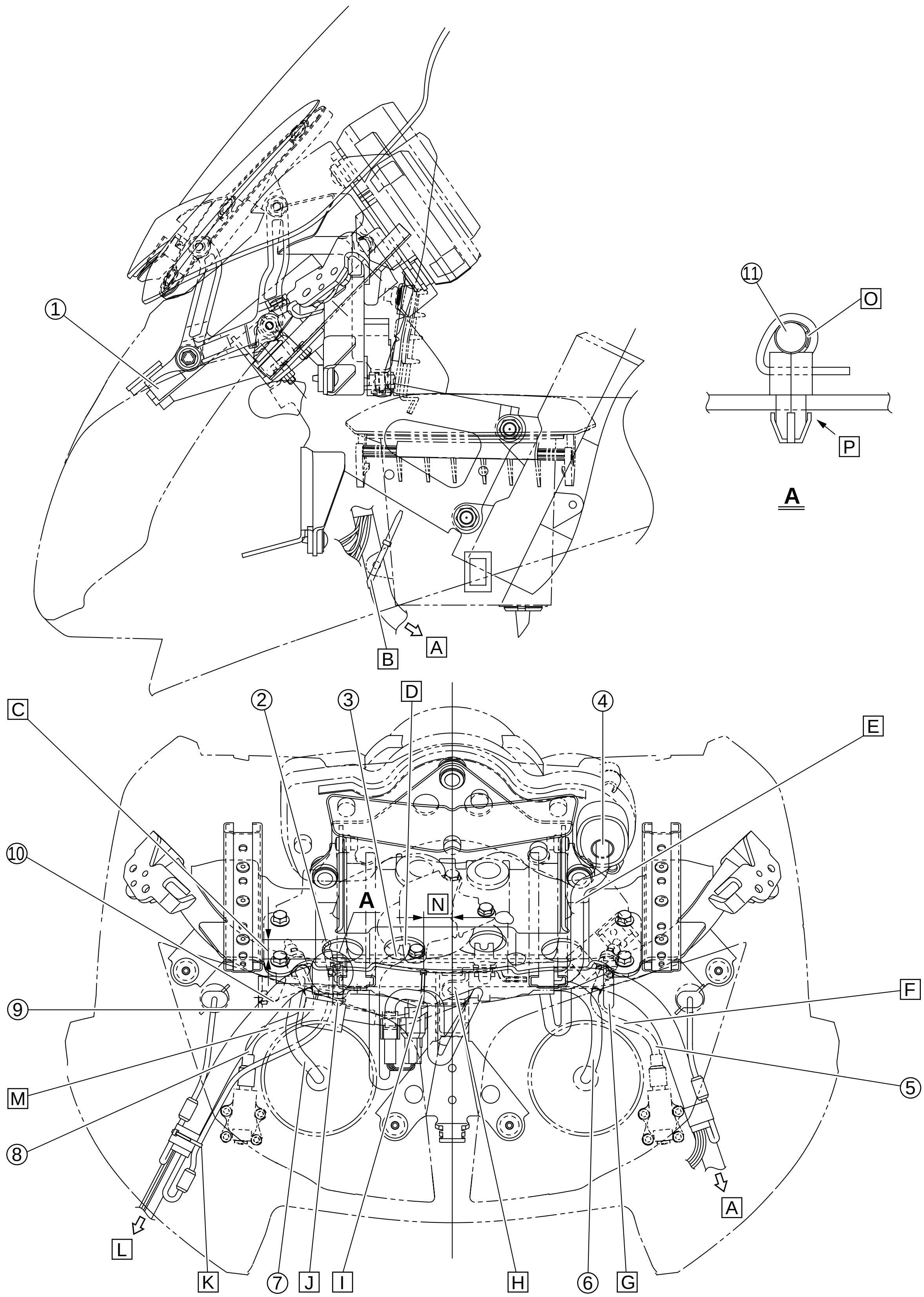
A. Route the tail/brake light assembly lead and license plate light lead between the rib and the U-lock holder on the rear fender, making sure that the leads are not routed on top of the holder.

B. Fasten the tail/brake light assembly lead and license plate light lead with the holder.

C. Route the tail/brake light assembly lead and license plate light lead between the ribs on the rear fender.

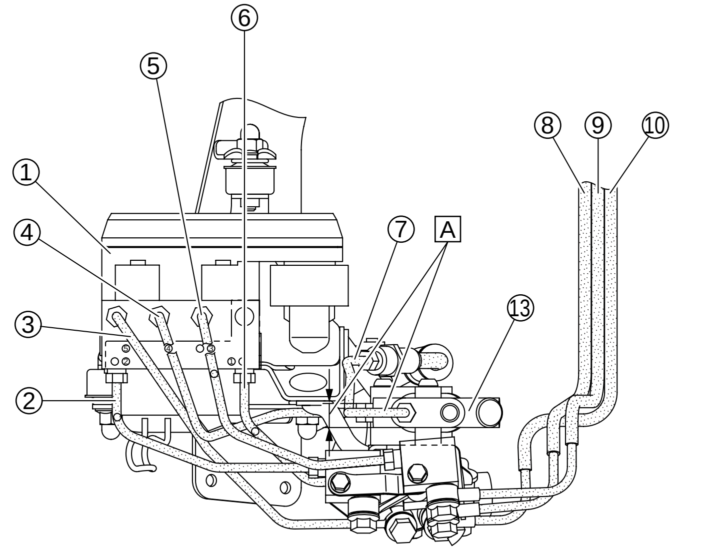
D. Route the intake air temperature sensor lead under the wire harness.

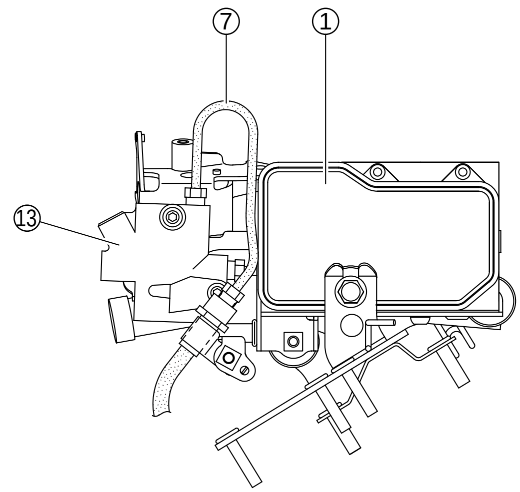
E. Fasten the intake air temperature sensor lead to the air filter case with the holder.


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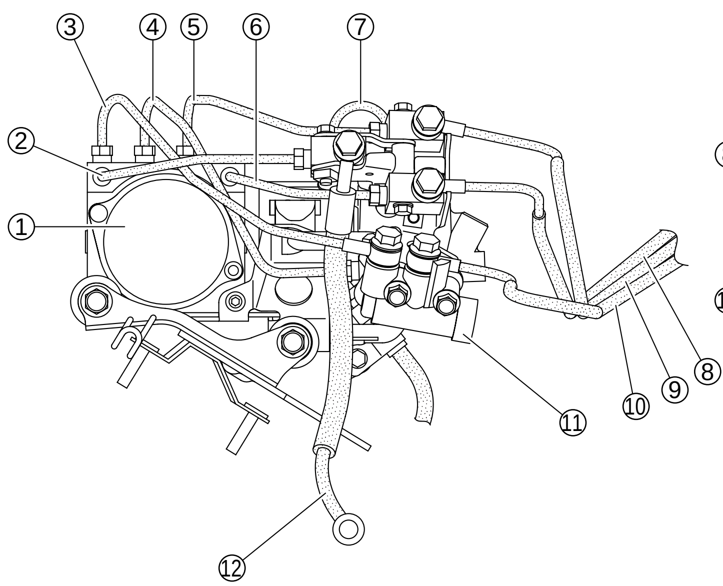
1. Windshield drive unit
2. Thermistor
3. Windshield drive unit lead
4. Meter assembly lead
5. Left headlight beam adjusting cable
6. Left headlight lead
7. Right headlight lead
8. Right headlight beam adjusting cable
9. Turn signal/hazard relay
10. Front cowling wire harness
11. Thermistor lead

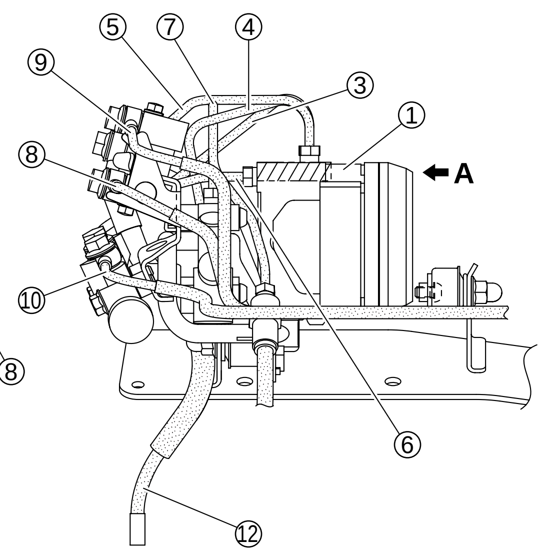
A. To wire harness
B. Fasten the front cowling wire harness to the stay on the accessory box with a plastic locking tie as shown in the illustration, making sure to position the tie below where the headlight leads branch off from the harness. Face the end of the plastic locking tie rearward, along the side of the accessory box. Do not cut off the excess end of the plastic locking tie.
C. Less than 20 mm (0.79 in)
D. Pass the windshield drive unit lead through the hole in the windshield drive unit/meter assembly stay.
E. Route the meter assembly lead under the windshield drive unit.
F. Route the left headlight beam adjusting cable under the left headlight lead.
G. Secure the plastic band by inserting the projection on the band into the hole in the front of the windshield drive unit/meter assembly stay, and then fasten the front cowling wire harness with the band after the headlight lead branches off from the harness.
H. Secure the front cowling wire harness at the location shown in the illustration by inserting the projection on its holder into the hole in the windshield drive unit/meter assembly stay.
I. Fasten the leads (to windshield drive unit) that branch off from the front cowling wire harness to the harness with a plastic locking tie, making sure to position the tie 20 mm (0.79 in) from the drive unit couplers.
J. Secure the plastic band by inserting the projection on the band into the hole in the front of the windshield drive unit/meter assembly stay, and then fasten the front cowling wire harness with the band before the headlight lead branches off from the harness.
K. Fasten the thermistor lead to the front cowling wire harness with a plastic locking tie, making sure to align the tie with the tape used to fasten the front right turn signal/position light lead. The thermistor lead should not be taut.
L. To front right turn signal/position light, right horn (high), and wire harness
M. Route the right headlight beam adjusting cable between the right headlight lead and the thermistor lead.
N. Position the plastic locking tie 25 mm (0.98 in) to the right of the center of the front cowling as shown in the illustration.
O. Fasten the thermistor lead with a plastic locking tie, and then cut off the excess end of the tie. Be sure to fold the protective sleeve against the lead to remove any space between the sleeve and the lead when fastening it.
P. Secure the plastic locking tie by inserting the projection on the tie into the hole in the rear of the windshield drive unit/meter assembly stay.





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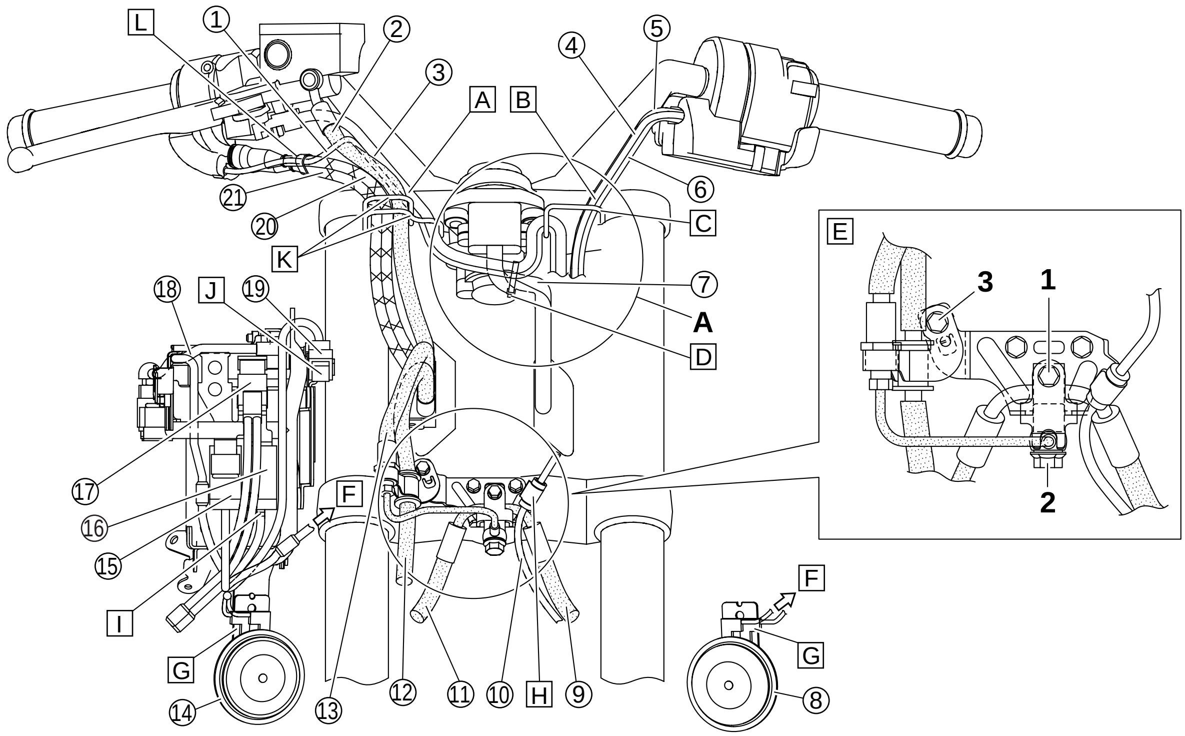


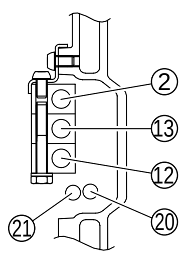


1. Hydraulic unit assembly
2. Brake pipe/middle joint assembly
3. Brake pipe (hydraulic unit to metering valve)
4. Brake pipe (hydraulic unit to proportioning valve)
5. Brake pipe/upper joint assembly
6. Brake pipe/lower joint assembly
7. Brake pipe (proportioning valve to rear brake hose)
8. Brake pipe (front brake master cylinder to brake pipe/lower joint assembly)
9. Brake pipe (brake pipe/upper joint assembly to front brake calipers)
10. Brake pipe (metering valve to right front brake caliper)
11. Metering valve
12. Brake hose (rear brake master cylinder to brake pipe/middle joint assembly)
13. Proportioning valve

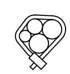
A. Position the brake pipe (proportioning valve to rear brake caliper) within the range shown in the illustration.

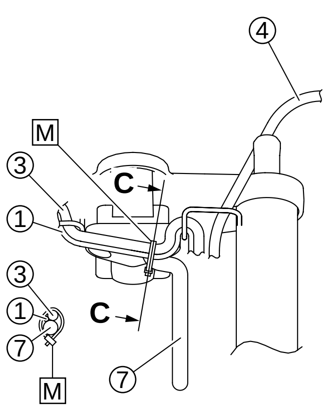
ET3P66048
CABLE ROUTING (FJR13AE)



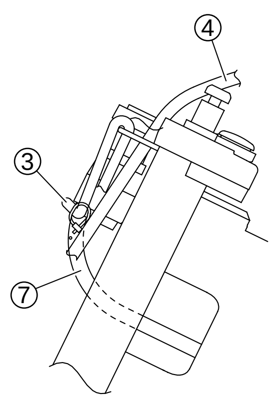


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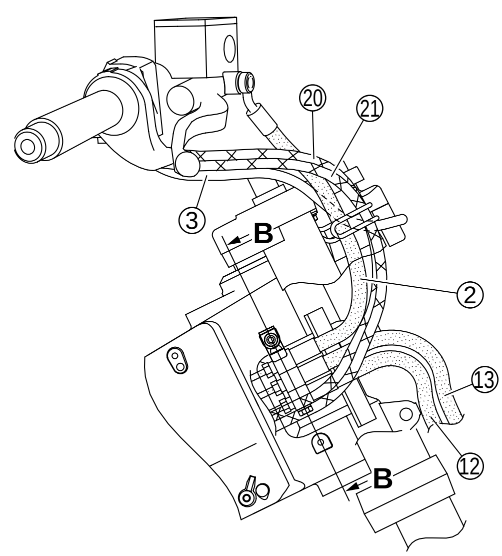




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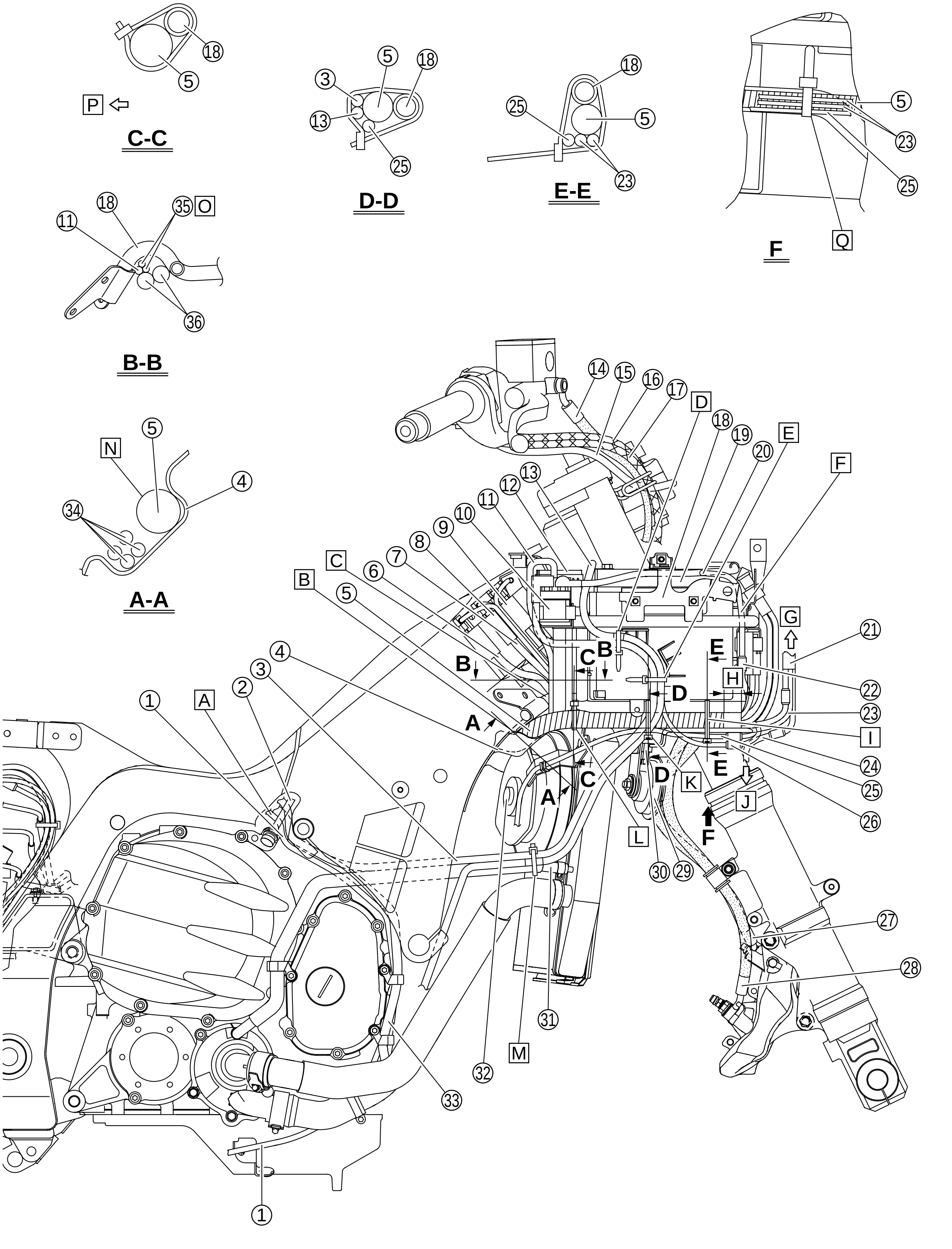


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1. Right grip warmer lead
2. Brake hose (front brake master cylinder to brake pipe/lower joint assembly)
3. Right handlebar switch lead
4. Left handlebar switch lead
5. Left grip warmer lead
6. Hand shift switch lead
7. Main switch lead
8. Left horn (low)
9. Brake hose (brake pipe/upper joint assembly to left front brake caliper)
10. Front wheel sensor lead
11. Brake hose (brake pipe/upper joint assembly to right front brake caliper)
12. Brake hose (metering valve to right front brake caliper)
13. Brake hose (brake pipe/upper joint assembly to front brake calipers)
14. Right horn (high)
15. Headlight (on/off)/grip warmer relay
16. Radiator fan motor relay
17. Main fuse
18. Positive battery lead
19. ABS test coupler
20. Throttle cable (accelerator cable)
21. Throttle cable (decelerator cable)

A. Route the right handlebar switch lead and right grip warmer lead under the handlebar.
B. Route the left handlebar switch lead, left grip warmer lead, and hand shift switch lead under the handlebar.
C. Pass the hand shift switch lead, right grip warmer lead, left grip warmer lead, right handlebar switch lead, and left handlebar switch lead through the guide.
D. Fasten the right handlebar switch lead, right grip warmer lead, and main switch lead with a plastic locking tie. Face the end of the plastic locking tie downward, angled inward, and then cut off the excess end of the tie.
E. Temporarily tighten the brake hose joint bolt, union bolt, and brake hose holder bolt in the proper tightening sequence as shown. Then, tighten the bolts to the specified torque, making sure to tighten the brake hose joint bolt “1” last.
F. To front cowling wire harness
G. Install the horn L-shaped connectors so that the leads are routed outward.
H. Fasten the grommet on the front wheel sensor lead with the holder.
I. Connect the coupler that has blue tape wrapped around its leads to the radiator fan motor relay.
J. Install the ABS test coupler completely onto the tab on the battery stay.
K. Pass the brake hose (front brake master cylinder to brake pipe/lower joint assembly), right handlebar switch lead, right grip warmer lead, and throttle cables through the guide as shown in the illustration.
L. Fasten the right grip warmer lead to the throttle cables with a plastic locking tie 10 mm (0.39 in) or less from the end of the throttle cable boot. Face the end of the plastic locking tie upward or downward, and then cut off the excess end of the tie.
M. Fasten the right handlebar switch lead, right grip warmer lead, and main switch lead with a plastic locking tie at the location shown in the illustration. Position the buckle of the plastic locking tie under the leads, with the end facing inward, and then cut off the excess end of the tie.


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1. O_2 sensor lead
2. Engine idling speed adjusting cable
3. Starter motor lead
4. Air deflector
5. Wire harness
6. Spark plug lead #4
7. Spark plug lead #1
8. Cylinders-#1/#4 ignition coil
9. Cylinders-#2/#3 ignition coil
10. Starter relay
11. Starter relay lead
12. Fuse box 2
13. Negative battery lead
14. Brake hose (front brake master cylinder to brake pipe/lower joint assembly)
15. Right handlebar switch lead
16. Throttle cable (accelerator cable)
17. Throttle cable (decelerator cable)
18. Battery stay
19. Battery
20. Positive battery lead
21. Front cowling wire harness
22. Positive battery lead coupler
23. Right horn (high) leads
24. Front right turn signal/position light lead
25. Right radiator fan motor lead
26. Ground lead coupler
27. Brake hose (brake pipe/upper joint assembly to right front brake caliper)
28. Brake hose (metering valve to right front brake caliper)
29. Right horn (high)
30. Right horn (high) connectors
31. Water pump breather hose
32. Right radiator fan
33. Crankshaft position sensor lead
34. Spark plug leads
35. Ignition coil primary leads
36. Fuse box leads

A. Route the O_2 sensor lead to the inside of the engine idling speed adjusting cable.

B. Make sure that the wire harness and spark plug leads are positioned in the indentation on the right side of the air deflector.

C. Route the spark plug leads to the inside of the battery stay pipe.

D. Fasten the negative battery lead at the blue tape and the starter motor lead to the battery box with a plastic locking tie. Face the end of the plastic locking tie downward. Do not cut off the excess end of the plastic locking tie.

E. Fasten the negative battery lead and starter motor lead to the battery box with a plastic locking tie. Face the end of the plastic locking tie rearward. Do not cut off the excess end of the plastic locking tie.

F. Route the positive battery lead between the battery stay and the battery box.

G. To front cowling wire harness

H. Align the rear end of the right radiator fan motor coupler with the tape on the wire harness as shown in the illustration.

I. Fasten the wire harness, right horn (high) leads, and right radiator fan motor lead with a plastic locking tie, making sure to install the tie on the fan motor lead’s protective sleeve. Face the end of the plastic locking tie outward. Do not cut off the excess end of the plastic locking tie.

J. To front right turn signal/position light

K. Fasten the wire harness, right radiator fan motor lead, negative battery lead, and starter motor lead to the battery stay with a plastic locking tie, making sure to install the tie on the fan motor lead’s protective sleeve and to position the tie in front of the air deflector. Face the end of the plastic locking tie outward, and then cut off the excess end of the tie.

L. Fasten the wire harness to the battery stay with a plastic locking tie. Face the end of the plastic locking tie upward, and then cut off the excess end of the tie.

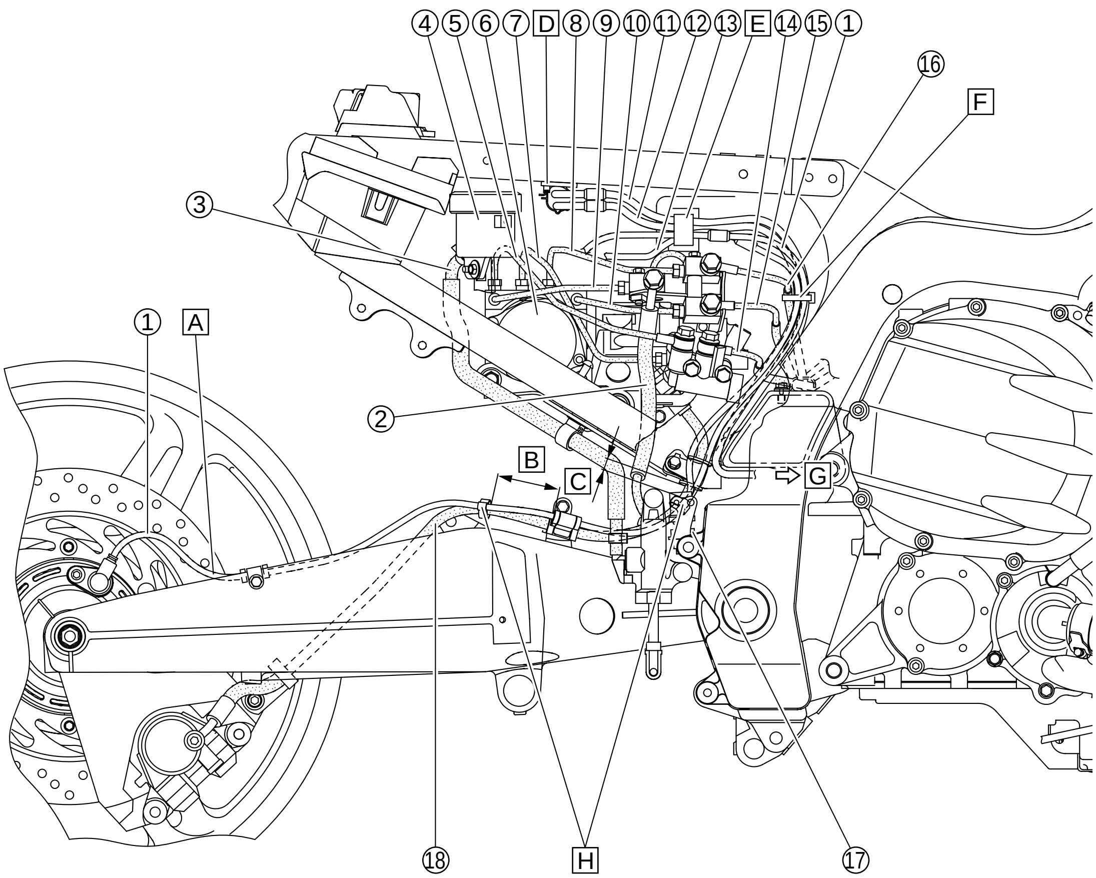
M. Fasten the negative battery lead at the blue tape, starter motor lead, and water pump breather hose with a plastic locking tie, making sure to install the tie around the end of the hose’s protective sleeve, and then cut off the excess end of the tie. Do not kink the water pump breather hose and do not face the end of the plastic locking tie downward.

N. Route the wire harness to the outside of the spark plug leads.

O. Route the ignition coil primary leads to the inside of the fuse box leads.

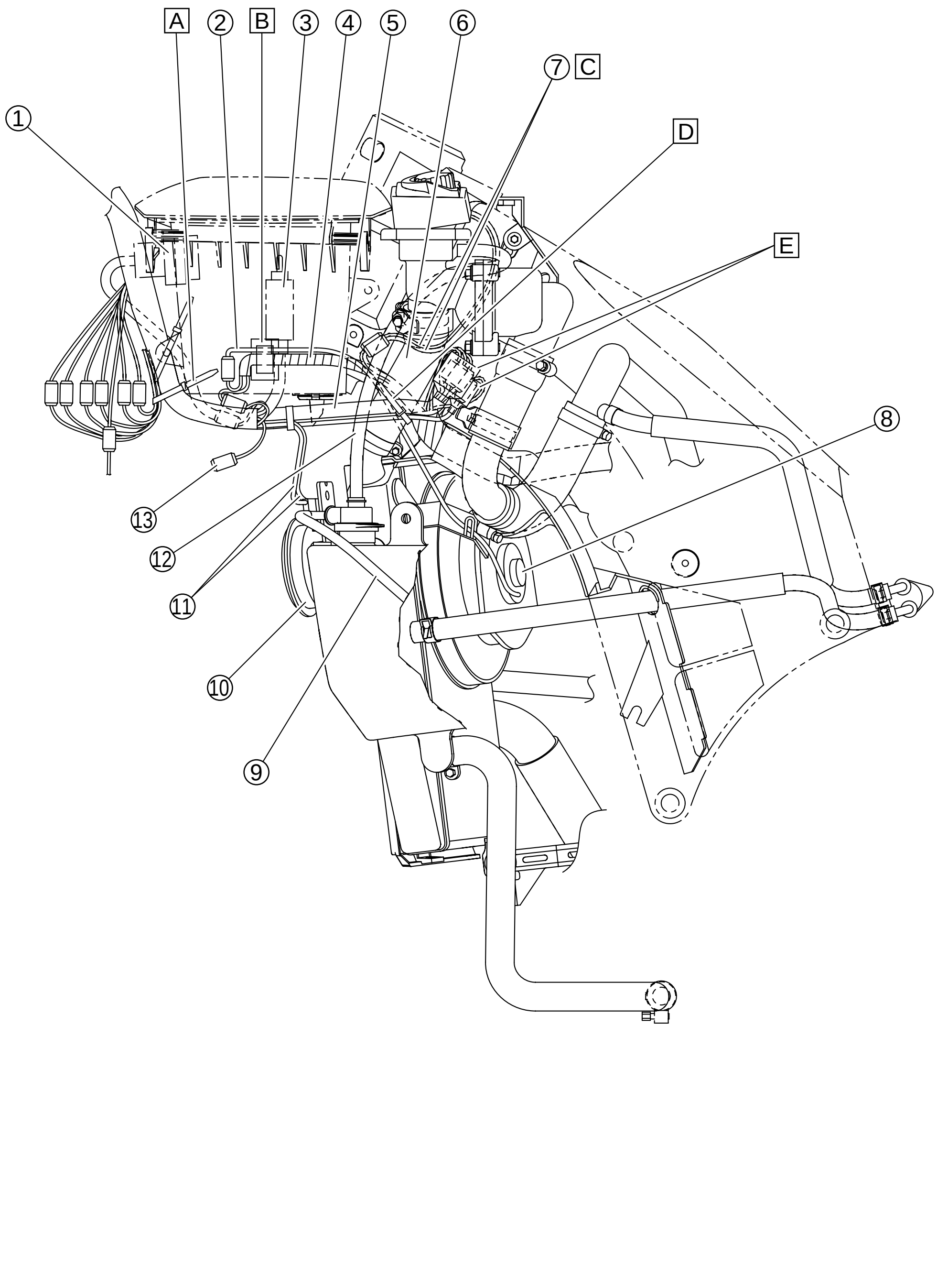
P. Outside of frame

Q. Position the plastic locking tie to the rear of the bend in the battery stay.


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1. Rear wheel sensor lead
2. Brake hose (rear brake master cylinder to brake pipe/middle joint assembly)
3. Rear brake fluid reservoir hose
4. Rear brake fluid reservoir
5. Brake pipe (hydraulic unit to metering valve)
6. Hydraulic unit assembly
7. Brake pipe (hydraulic unit to proportioning valve)
8. Brake pipe/upper joint assembly
9. Brake pipe/middle joint assembly
10. Brake pipe/lower joint assembly
11. Clutch actuator motor lead
12. Clutch actuator sensor lead
13. Rear brake light switch lead
14. Brake pipe (metering valve to right front brake caliper)
15. Brake pipe (front brake master cylinder to brake pipe/lower joint assembly)
16. Brake pipe (brake pipe/upper joint assembly to front brake calipers)
17. Rear brake light switch
18. Brake hose (brake pipe to rear brake caliper)

A. Route the rear wheel sensor lead to the inside of the swingarm, making sure that the lead does not protrude above the swingarm.
B. 45–55 mm (1.77–2.17 in)
C. 20–30 mm (0.79–1.18 in)
D. Fasten the clutch actuator motor lead and clutch actuator sensor lead with the holder.
E. Fasten the rear brake light switch lead, rear wheel sensor lead, clutch actuator motor lead, and clutch actuator sensor lead with the holder.
F. Fasten the brake pipe (brake pipe/upper joint assembly to front brake calipers), clutch actuator motor lead, clutch actuator sensor lead, rear wheel sensor lead, and rear brake light switch lead with a plastic locking tie. Face the end of the plastic locking tie inward.
G. To clutch actuator
H. Fasten the rear wheel sensor lead to the brake hose (brake pipe to rear brake caliper) with the two holders, making sure that the fastener of each holder faces inward.


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1. Auxiliary DC jack
2. Left radiator fan motor lead
3. Accessory box solenoid
4. Wire harness
5. Front cowling wire harness
6. Radiator inlet hose
7. Grip warmer control unit leads
8. Left radiator fan
9. Coolant reservoir breather hose
10. Left horn (low)
11. Left horn (low) leads
12. Coolant reservoir hose
13. Joint coupler

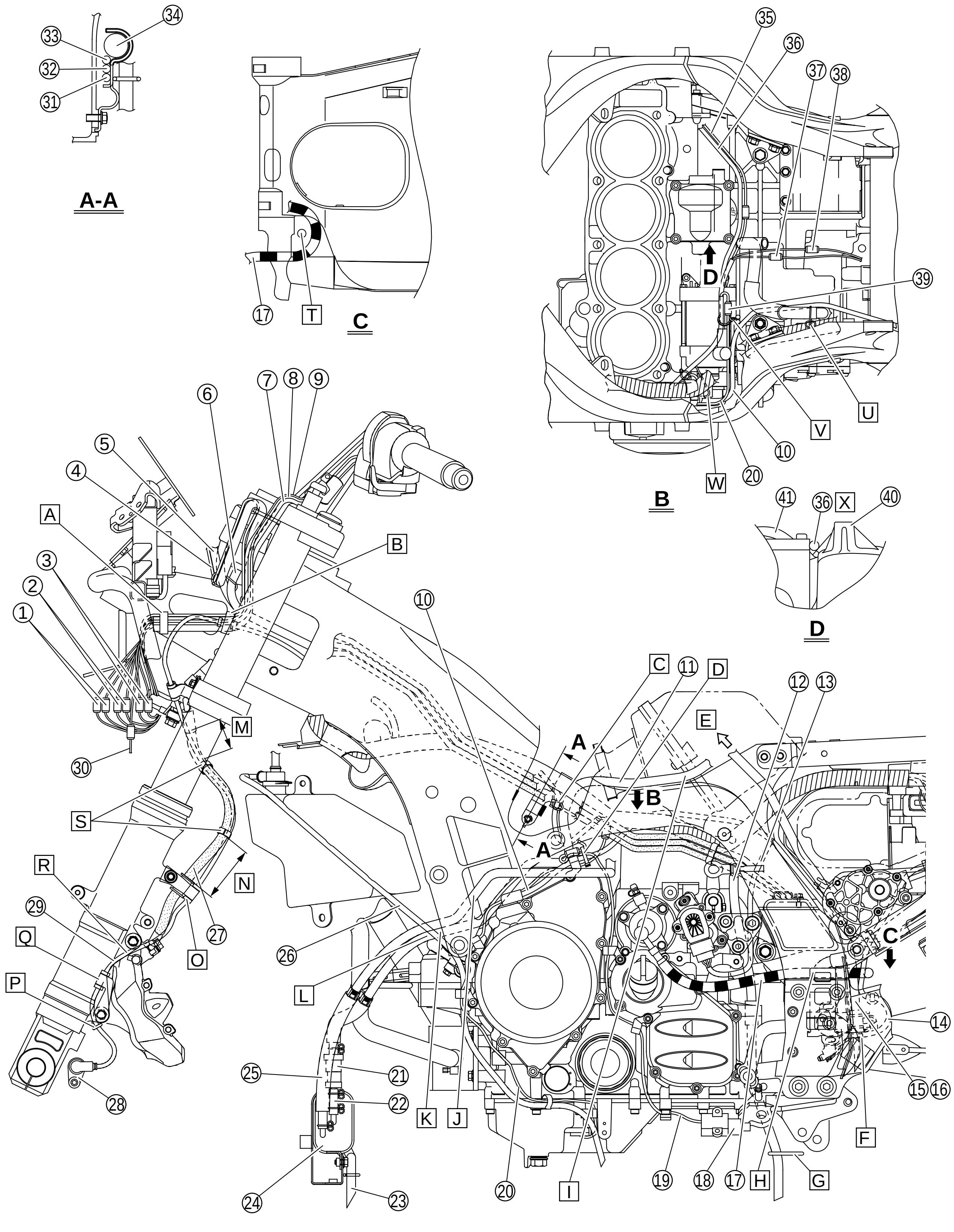
A. Fasten the handlebar switch leads, hand shift switch lead, and grip warmer leads to the front cowling wire harness with a plastic locking tie. Face the end of the plastic locking tie rearward, along the side of the accessory box. Do not cut off the excess end of the plastic locking tie.

B. Fasten the wire harness and left radiator fan motor lead with the holder.

C. Route the grip warmer control unit leads to the front of the coolant reservoir hose.

D. Fasten the front cowling wire harness to the radiator inlet hose with a plastic locking tie, making sure to install the tie on the harness' protective sleeve. Face the end of the plastic locking tie upward. Do not cut off the excess end of the plastic locking tie.

E. After connecting the couplers, cover them completely with the cover, and then push them in between the radiator inlet hose and the thermostat inlet hose 2.


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1. Grip warmer couplers
2. Hand shift switch couplers
3. Handlebar switch couplers
4. Right grip warmer lead
5. Right handlebar switch lead
6. Main switch lead
7. Hand shift switch lead
8. Left grip warmer lead
9. Left handlebar switch lead
10. Stator coil lead
11. Fuel tank breather hose (joint to rollover valve) (for California only)
12. Air filter case breather hose
13. Gear position sensor lead
14. Foot shift switch lead
15. Fuel tank breather/overflow hose (except for California)
16. Fuel tank overflow hose (for California only)
17. Clutch hose
18. Sidestand switch
19. Sidestand switch lead
20. Oil level switch lead
21. Rollover valve (for California only)
22. Fuel tank breather hose (rollover valve to canister) (for California only)
23. Canister breather hose (for California only)
24. Canister (for California only)
25. Canister purge hose (3-way joint to canister) (for California only)
26. Coolant reservoir breather hose
27. Brake hose (brake pipe/upper joint assembly to left front brake caliper)
28. Front wheel sensor
29. Front wheel sensor lead
30. Front left turn signal/position light lead
31. Brake pipe (metering valve to right front brake caliper)
32. Brake pipe (brake pipe/upper joint assembly to front brake calipers)
33. Brake pipe (front brake master cylinder to brake pipe/lower joint assembly)
34. Wire harness
35. Crankshaft position sensor lead
36. Starter motor lead
37. Neutral switch coupler
38. YCC-S speed sensor coupler
39. Oil level switch coupler
40. Upper crankcase
41. Rear balancer cover

A. Secure the plastic band by inserting the projection on the band into the hole in the windshield drive unit/meter assembly stay, and then fasten the handlebar switch leads, grip warmer leads, and hand shift switch leads with the band, making sure that the end of the band faces down. Do not cut off the excess end of the plastic band.

B. Secure the plastic band by inserting the projection on the band into the hole in the windshield drive unit/meter assembly stay, and then fasten the handlebar switch leads, grip warmer leads, hand shift switch leads and front wheel sensor lead with the band, making sure that the end of the band faces down. Do not cut off the excess end of the plastic band.

C. Fasten the leads (to oil level switch and crankshaft position sensor) that branch off from the wire harness to the guide on the holder with a plastic locking tie, making sure that the end of the tie faces upward. Do not cut off the excess end of the plastic locking tie.

D. Fasten the sidestand switch lead, stator coil lead, and oil level switch lead with a plastic locking tie, making sure to bundle and fasten the sidestand switch lead so that the coupler is positioned to the front of the tie. Face the end of the plastic locking tie outward. Do not cut off the excess end of the plastic locking tie.

E. To fuel tank

F. Pass the fuel tank breather/overflow hose through the guide on the universal joint dust cover.

G. Pass the air filter case breather hose through the guide on the muffler bracket.

H. Fasten the clutch hose with the pivot shaft locknut retainer.

I. Pass the fuel tank breather hose (joint to rollover valve) between the frame and the projection on the air filter case as shown in the illustration. (for California only)

J. Pass the canister purge hose (3-way joint to canister) through the opening in the frame, to the inside of the frame. (for California only)

K. Pass the fuel tank breather hose (joint to rollover valve) through the cutout in the air deflector. (for California only)

L. Route the coolant reservoir breather hose to the outside of the fuel tank breather hose (joint to rollover valve) and the canister purge hose (3-way joint to canister). (for California only)

M. 43–53 mm (1.69–2.09 in)

N. 60–70 mm (2.36–2.76 in)

O. Fasten the grommets on the front wheel sensor lead and the brake hose (brake pipe/upper joint assembly to left front brake caliper) with the holder.

P. Pass the front wheel sensor lead through the guide.

Q. Fasten the grommet on the front wheel sensor lead with the holder.

R. Route the front wheel sensor lead between the left front brake caliper and the brake hose (brake pipe/upper joint assembly to left front brake caliper).

S. Fasten the front wheel sensor lead to the brake hose (brake pipe/upper joint assembly to left front brake caliper) with the two holders, making sure to position the lead to the inside of the hose.

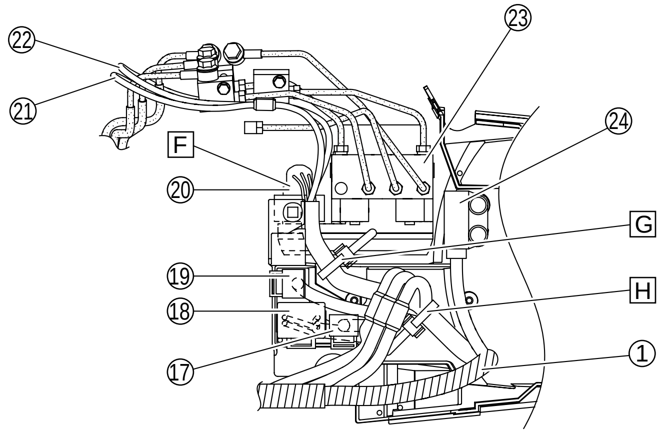
T. Route the fuel tank breather/overflow hose to the front of the clutch hose, then through the opening between the frame and the swingarm.

U. Face the ends of the clamp to the left, making sure that the lower end contacts the wire harness.

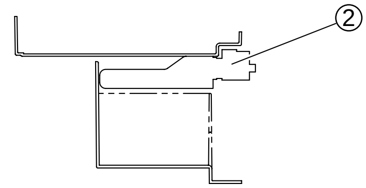
V. Fasten the oil level switch lead and starter motor lead with the clamp.

W. To sidestand switch

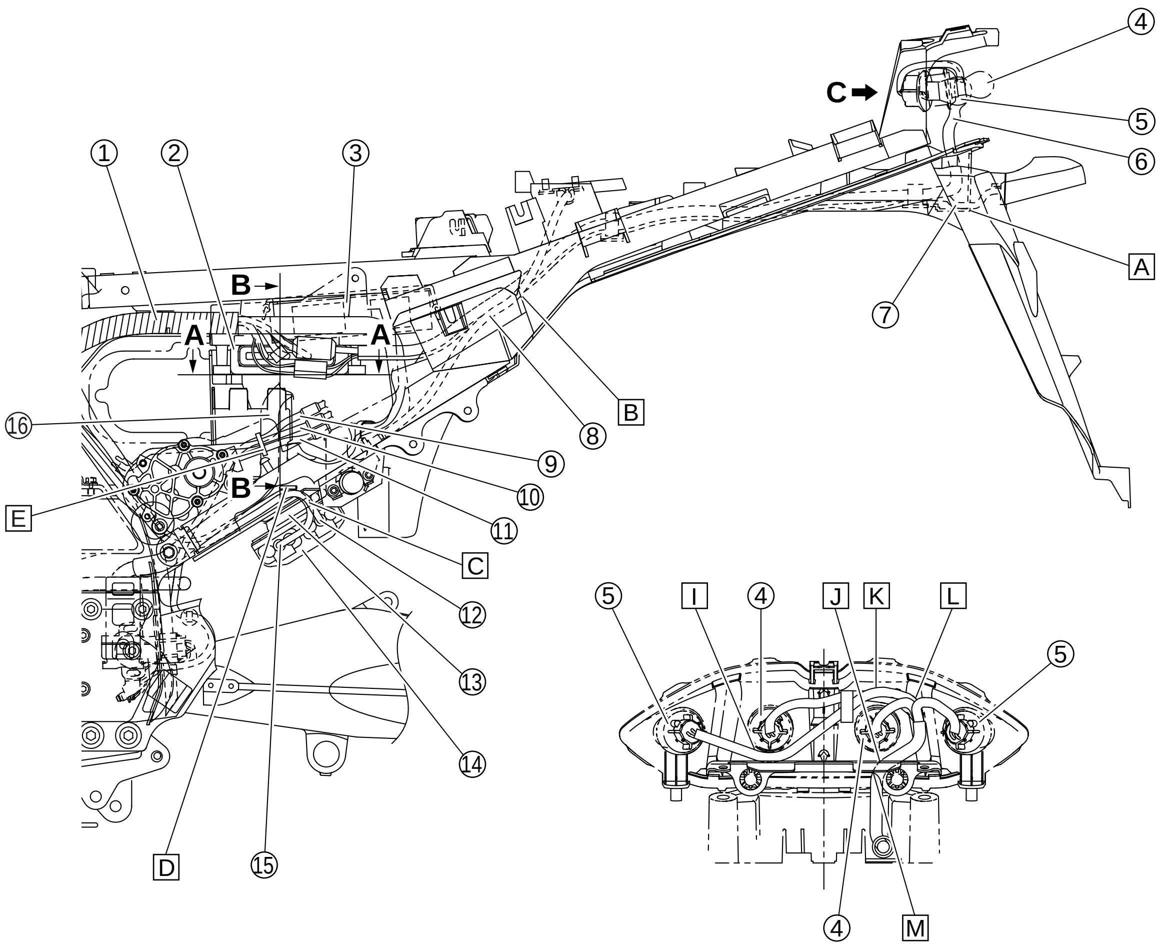
X. Route the starter motor lead between the rear balancer cover bolt and the rib on the crankcase.


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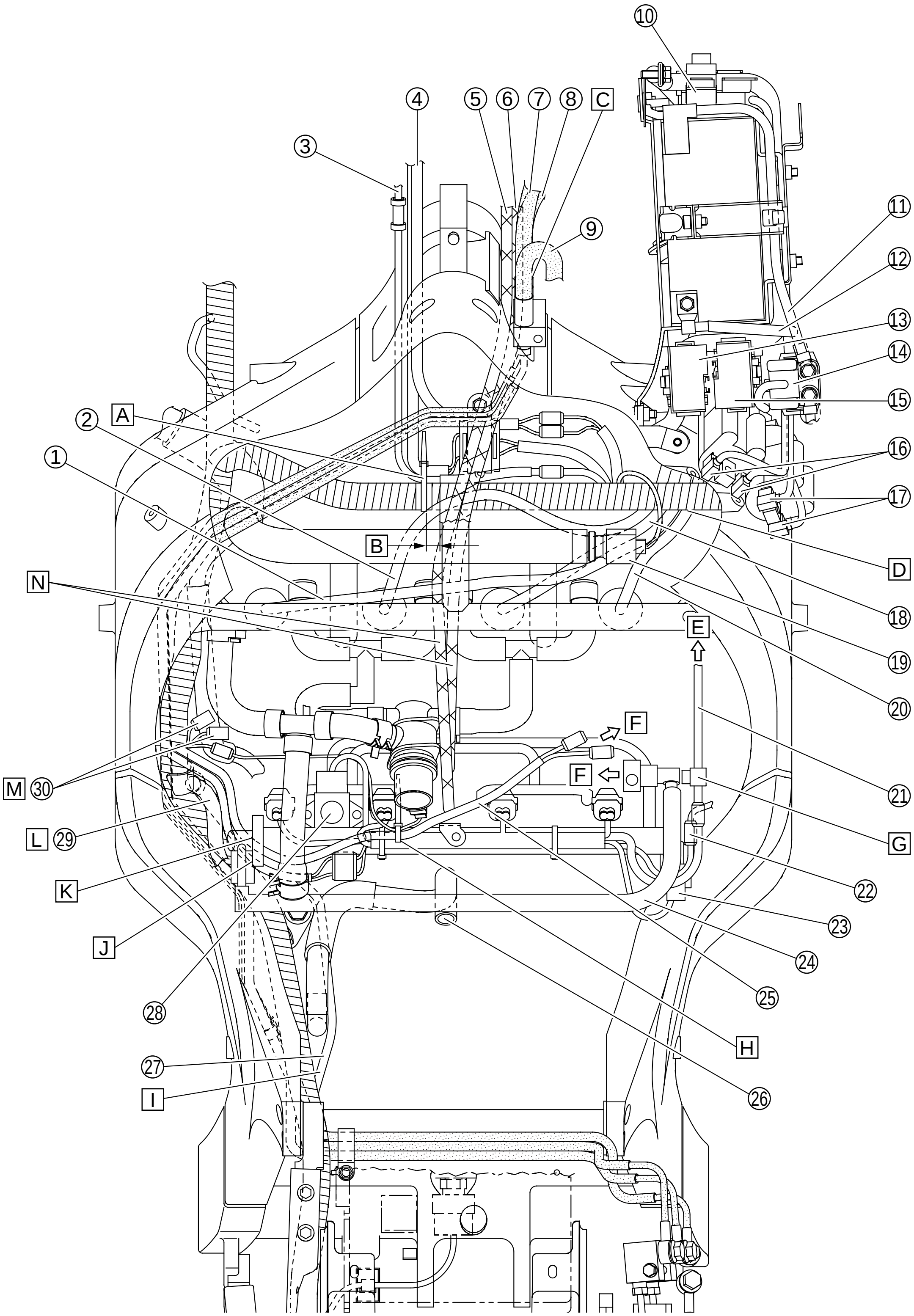
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1. Wire harness
2. ECU (engine control unit)
3. MCU (motor control unit)
4. Tail/brake light
5. Rear turn signal light
6. Tail/brake light assembly lead
7. License plate light lead
8. Seat lock cable
9. Foot shift switch lead
10. Shift actuator motor lead
11. Shift actuator sensor lead
12. Stator coil lead
13. Rear shock absorber spring preload adjusting cable
14. Rectifier/regulator
15. Rectifier/regulator lead
16. Clutch fluid reservoir hose
17. YCC-S control relay
18. Relay unit
19. Brake light relay
20. ABS ECU coupler
21. Rear wheel sensor lead
22. Rear brake light switch lead
23. Hydraulic unit assembly
24. Lean angle sensor

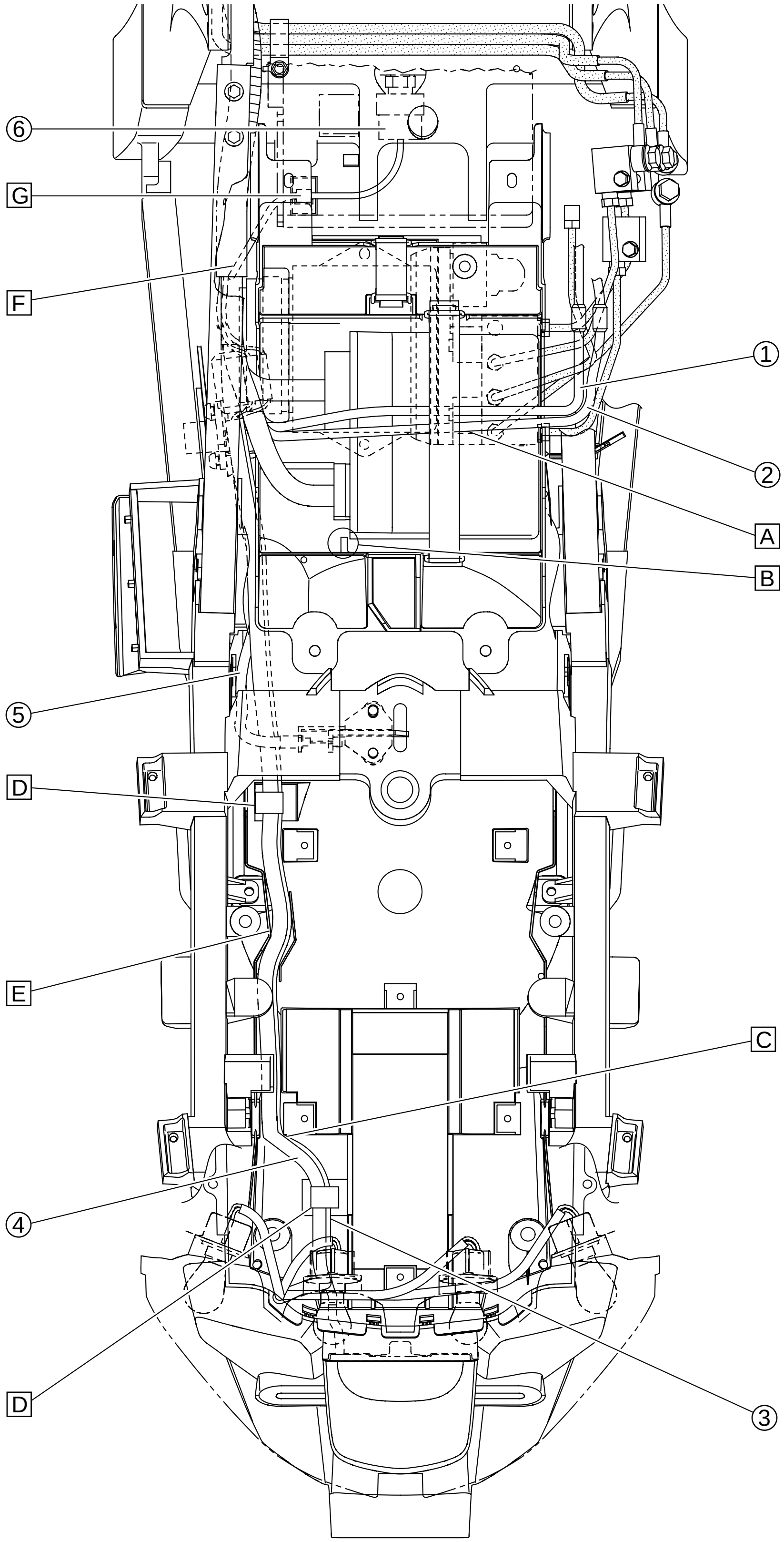
A. Pass the license plate light lead through the hole in the rear fender.
B. Route the wire harness to the inside of the seat lock cable.
C. Route the stator coil lead and rectifier/regulator lead to the outside of the rear shock absorber spring preload adjusting cable and under the clutch fluid reservoir hose.
D. Pass the stator coil lead and rectifier/regulator lead through the guide on the frame.
E. Fasten the shift actuator motor lead, shift actuator sensor lead, and foot shift switch lead with a plastic locking tie, making sure to install the tie on each lead’s protective sleeve. Face the end of the plastic locking tie inward, without cutting off the excess end.
F. Securely connect the ABS ECU coupler.
G. Secure the plastic band by inserting the projection on the band into the hole in the rear fender, and then fasten the wire harness at the positioning tape with the band.
H. Secure the plastic band by inserting the projection on the band into the hole in the rear fender, and then fasten the wire harness with the band.
I. Route the rear right turn signal light lead under the right tail/brake light bulb socket.
J. Route the tail/brake light assembly lead between the left tail/brake light bulb socket and the mounting boss on the tail/brake light assembly.
K. Route the rear right turn signal light lead and right tail/brake light lead over the left tail/brake light bulb socket.
L. Route the leads between the left tail/brake light bulb socket and the rear left turn signal light bulb socket.
M. Route the tail/brake light assembly lead between the tail/brake light assembly and its bracket.



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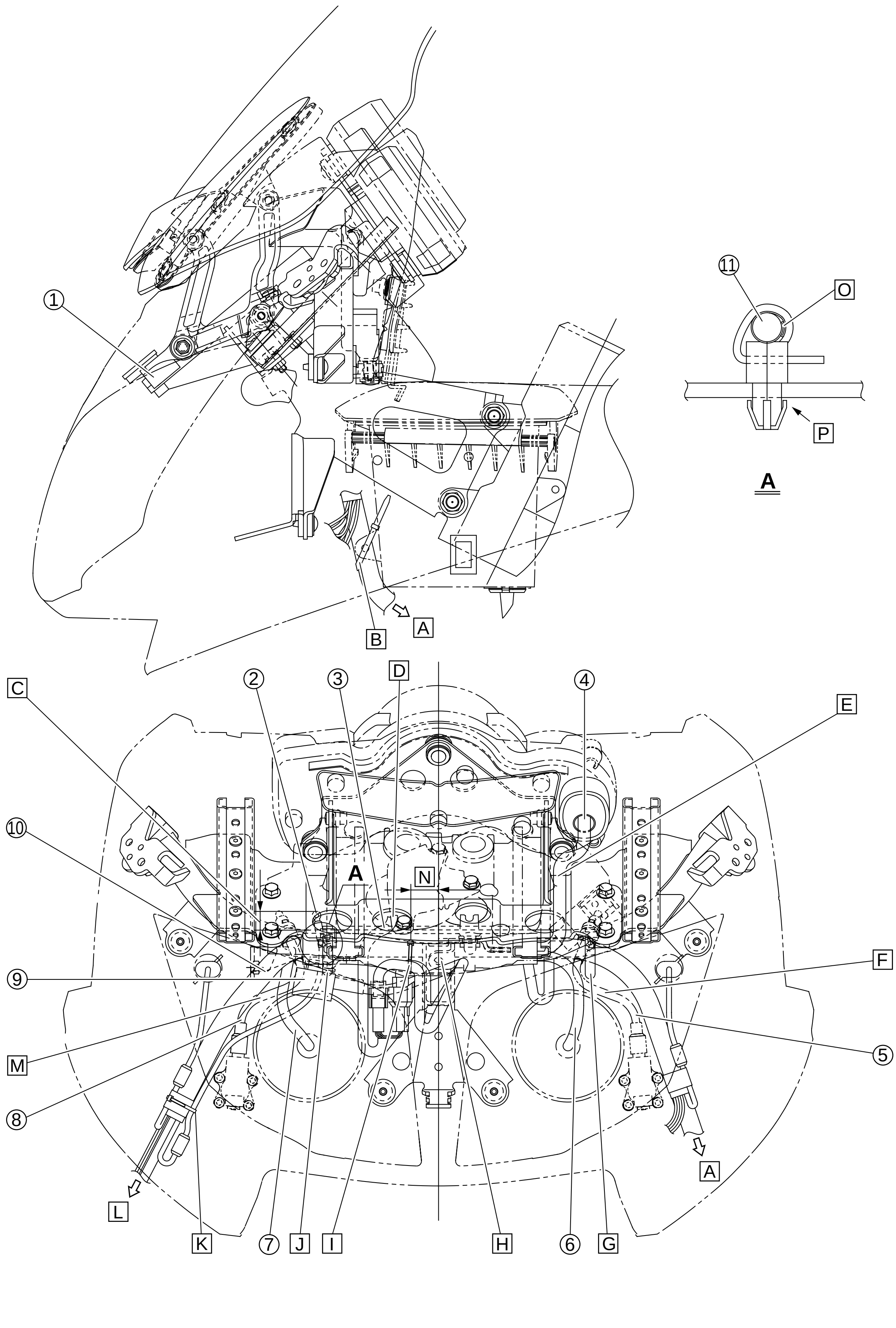
1. Spark plug lead #1
2. Spark plug lead #2
3. Front wheel sensor lead
4. Main switch lead
5. Throttle cable (accelerator cable)
6. Throttle cable (decelerator cable)
7. Brake hose (brake pipe/upper joint assembly to front brake calipers)
8. Brake hose (metering valve to right front brake caliper)
9. Brake hose (front brake master cylinder to brake pipe/lower joint assembly)
10. Main fuse
11. Positive battery lead
12. Negative battery lead
13. Fuse box 1 (identified by blue tape on lead)
14. Starter relay
15. Fuse box 2
16. Cylinders-#2/#3 ignition coil connectors (white)
17. Cylinders-#1/#4 ignition coil connectors (black)
18. Spark plug lead #3
19. Coolant temperature sensor
20. Spark plug lead #4
21. Cylinder identification sensor lead
22. O_2 sensor coupler
23. Throttle position sensor
24. Fuel hose
25. Fuel pump/fuel sender lead
26. Crankcase breather hose
27. Stator coil lead
28. Intake air pressure sensor
29. Fuel tank breather hose (joint to rollover valve) (for California only)
30. Joint couplers

A. Fasten the front wheel sensor lead to the wire harness with a plastic locking tie, making sure to align the tie with the white tape on the harness. Face the end of the plastic locking tie forward. Do not cut off the excess end of the plastic locking tie.
B. Position the plastic locking tie 0–20 mm (0–0.79 in) from the end of the protective sleeve of the front wheel sensor lead.
C. Route the throttle cables and brake hoses through the right opening in the frame.
D. Route the wire harness over the spark plug leads.
E. To cylinder identification sensor
F. To fuel tank
G. Fasten the cylinder identification sensor lead with the holder on the throttle body.
H. Fasten the fuel pump/fuel sender lead and air induction system solenoid lead with a plastic locking tie, making sure that the end of the tie faces forward. Do not cut off the excess end of the plastic locking tie.
I. Route the stator coil lead to the inside of the engine bracket (top) and under the crankcase breather hose.
J. Route the wire harness (to sub-wire harness) under the fuel hose connector.
K. Route the fuel pump/fuel sender lead under the fuel hose connector.
L. Route the fuel tank breather hose (joint to rollover valve) next to the wire harness and pass it through the guide. (for California only)
M. Place the joint couplers in the area shown in the illustration, making sure that they do not protrude above the wire harness.
N. Route the throttle cables over the main switch lead, spark plug lead #2, and wire harness, and under spark plug lead #1.


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1. Clutch actuator motor lead
2. Clutch actuator sensor lead
3. License plate light lead
4. Tail/brake light assembly lead
5. Seat lock cable
6. Intake air temperature sensor

A. Fasten the clutch actuator motor lead and clutch actuator sensor lead with the band that is used to secure the MCU (motor control unit).
B. Make sure that the MCU (motor control unit) is not resting on top of the storage compartment projection.
C. Route the tail/brake light assembly lead and license plate light lead between the rib and the U-lock holder on the rear fender, making sure that the leads are not routed on top of the holder.
D. Fasten the tail/brake light assembly lead and license plate light lead with the holder.
E. Route the tail/brake light assembly lead and license plate light lead between the ribs on the rear fender.
F. Route the intake air temperature sensor lead under the wire harness.
G. Fasten the intake air temperature sensor lead to the air filter case with the holder.


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1. Windshield drive unit
2. Thermistor
3. Windshield drive unit lead
4. Meter assembly lead
5. Left headlight beam adjusting cable
6. Left headlight lead
7. Right headlight lead
8. Right headlight beam adjusting cable
9. Turn signal/hazard relay
10. Front cowling wire harness
11. Thermistor lead

A. To wire harness

B. Fasten the front cowling wire harness to the stay on the accessory box with a plastic locking tie as shown in the illustration, making sure to position the tie below where the headlight leads branch off from the harness. Face the end of the plastic locking tie rearward, along the side of the accessory box. Do not cut off the excess end of the plastic locking tie.

C. Less than 20 mm (0.79 in)

D. Pass the windshield drive unit lead through the hole in the windshield drive unit/meter assembly stay.

E. Route the meter assembly lead under the windshield drive unit.

F. Route the left headlight beam adjusting cable under the left headlight lead.

G. Secure the plastic band by inserting the projection on the band into the hole in the front of the windshield drive unit/meter assembly stay, and then fasten the front cowling wire harness with the band after the headlight lead branches off from the harness.

H. Secure the front cowling wire harness at the location shown in the illustration by inserting the projection on its holder into the hole in the windshield drive unit/meter assembly stay.

I. Fasten the leads (to windshield drive unit) that branch off from the front cowling wire harness to the harness with a plastic locking tie, making sure to position the tie 20 mm (0.79 in) from the drive unit couplers.

J. Secure the plastic band by inserting the projection on the band into the hole in the front of the windshield drive unit/meter assembly stay, and then fasten the front cowling wire harness with the band before the headlight lead branches off from the harness.

K. Fasten the thermistor lead to the front cowling wire harness with a plastic locking tie, making sure to align the tie with the tape used to fasten the front right turn signal/position light lead. The thermistor lead should not be taut.

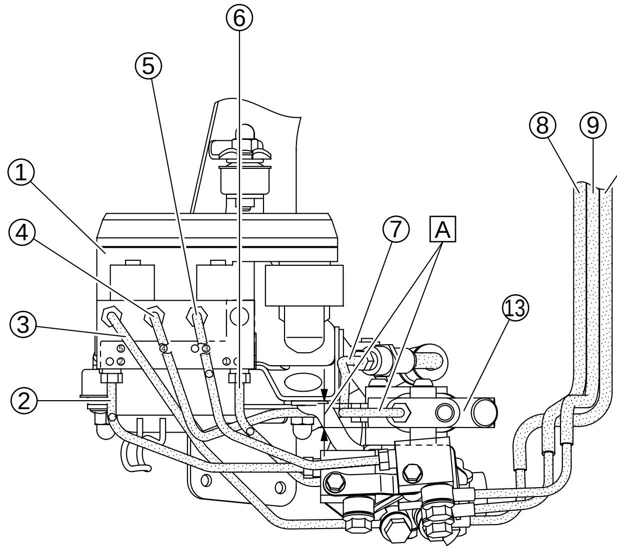
L. To front right turn signal/position light, right horn (high), and wire harness

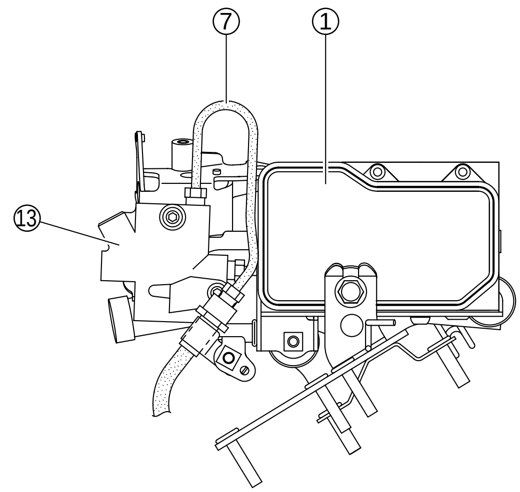
M. Route the right headlight beam adjusting cable between the right headlight lead and the thermistor lead.

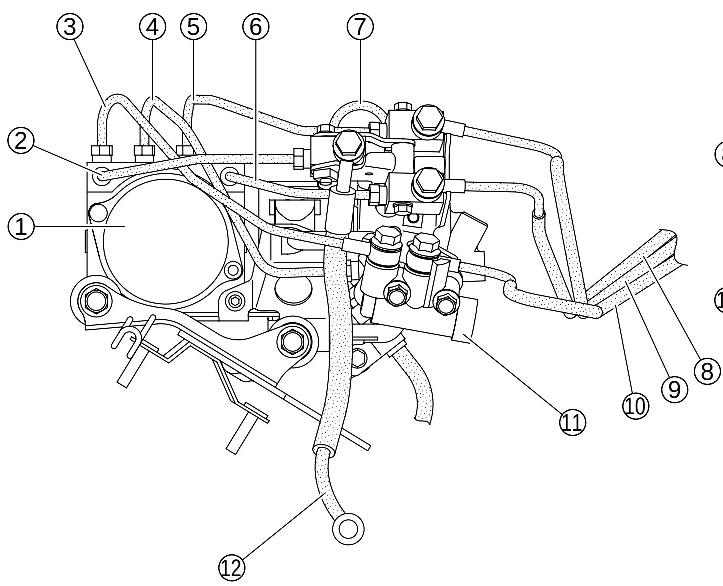
N. Position the plastic locking tie 25 mm (0.98 in) to the right of the center of the front cowling as shown in the illustration.

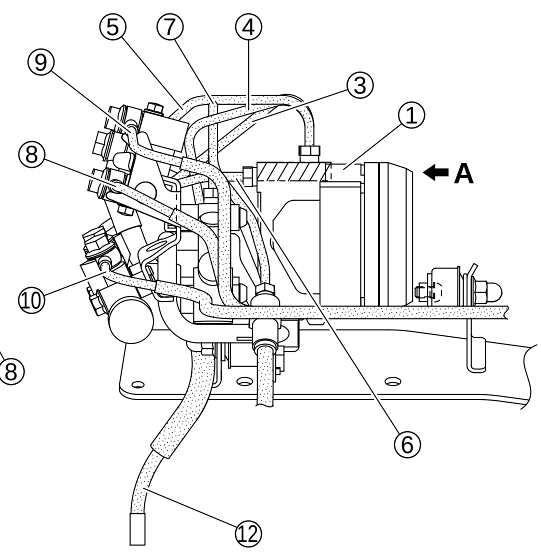
O. Fasten the thermistor lead with a plastic locking tie, and then cut off the excess end of the tie. Be sure to fold the protective sleeve against the lead to remove any space between the sleeve and the lead when fastening it.

P. Secure the plastic locking tie by inserting the projection on the tie into the hole in the rear of the windshield drive unit/meter assembly stay.


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1. Hydraulic unit assembly
2. Brake pipe/middle joint assembly
3. Brake pipe (hydraulic unit to metering valve)
4. Brake pipe (hydraulic unit to proportioning valve)
5. Brake pipe/upper joint assembly
6. Brake pipe/lower joint assembly
7. Brake pipe (proportioning valve to rear brake hose)
8. Brake pipe (front brake master cylinder to brake pipe/lower joint assembly)
9. Brake pipe (brake pipe/upper joint assembly to front brake calipers)
10. Brake pipe (metering valve to right front brake caliper)
11. Metering valve
12. Brake hose (rear brake master cylinder to brake pipe/middle joint assembly)
13. Proportioning valve

A. Position the brake pipe (proportioning valve to rear brake caliper) within the range shown in the illustration.

PERIODIC CHECKS AND ADJUSTMENTS

EAS20450

PERIODIC MAINTENANCE

EAS20460

INTRODUCTION

This chapter includes all information necessary to perform recommended checks and adjustments. If followed, these preventive maintenance procedures will ensure more reliable vehicle operation, a longer service life and reduce the need for costly overhaul work. This information applies to vehicles already in service as well as to new vehicles that are being prepared for sale. All service technicians should be familiar with this entire chapter.

EAU17600

PERIODIC MAINTENANCE CHART FOR THE EMISSION CONTROL SYSTEM (FJR13A)

No.		ITEM	ROUTINE	INITIAL	ODOMETER READINGS				
				600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
1	*	**Fuel line**	• Check fuel hoses for cracks or damage. • Replace if necessary.		√	√	√	√	√
2	*	**Spark plugs**	• Check condition. • Adjust gap and clean. • Replace every 8000 mi (13000 km) or 12 months.		√	Replace.	√	Replace.	√
3	*	**Valve clearance**	• Check and adjust valve clearance when engine is cold.	Every 26600 mi (42000 km)					
4	*	**Crankcase breather system**	• Check breather hose for cracks or damage. • Replace if necessary.		√	√	√	√	√
5	*	**Fuel injection**	• Check and adjust engine idle speed and synchronization.	√	√	√	√	√	√
6	*	**Exhaust system**	• Check for leakage. • Tighten if necessary. • Replace gasket(s) if necessary.		√	√	√	√	√
7	*	**Evaporative emission control system (For California only)**	• Check control system for damage. • Replace if necessary.				√		
8	*	**Air induction system**	• Check the air cut-off valve, reed valve, and hose for damage. • Replace any damaged parts.			√		√	

* Since these items require special tools, data and technical skills, have a Yamaha dealer perform the service.

EAU32185

GENERAL MAINTENANCE AND LUBRICATION CHART (FJR13A)

No.		ITEM	ROUTINE	INITIAL	ODOMETER READINGS				
				600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
1	*	**Air filter element**	• Clean with compressed air. • Replace if necessary.		√	√	√	√	√
2	*	**Clutch**	• Check operation and fluid leakage. • Correct if necessary.	√	√	√	√	√	√
3	*	**Front brake**	• Check operation, fluid level, and for fluid leakage. • Replace brake pads if necessary.	√	√	√	√	√	√
4	*	**Rear brake**	• Check operation, fluid level, and for fluid leakage. • Replace brake pads if necessary.	√	√	√	√	√	√

No.		ITEM	ROUTINE	INITIAL	ODOMETER READINGS				
				600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
5	*	**Brake hoses**	• Check for cracks or damage.		√	√	√	√	√
			• Replace.	Every 4 years					
6	*	**Wheels**	• Check runout and for damage. • Replace if necessary.		√	√	√	√	√
7	*	**Tires**	• Check tread depth and for damage. • Replace if necessary. • Check air pressure. • Correct if necessary.		√	√	√	√	√
8	*	**Wheel bearings**	• Check bearings for smooth operation. • Replace if necessary.		√	√	√	√	√
9	*	**Swingarm pivot bearings**	• Check bearing assemblies for looseness. • Moderately repack with lithium-soap-based grease.			√		Repack.	
10	*	**Steering bearings**	• Check bearing assemblies for looseness. • Moderately repack with lithium-soap-based grease every 16000 mi (25000 km) or 24 months.	√	√	√	√	Repack.	√
11	*	**Chassis fasteners**	• Check all chassis fitting and fasteners. • Correct if necessary.		√	√	√	√	√
12		**Brake lever pivot shaft**	• Apply silicone grease lightly.		√	√	√	√	√
13		**Brake pedal pivot shaft**	• Apply lithium-soap-based grease lightly.		√	√	√	√	√
14		**Clutch lever pivot shaft**	• Apply silicone grease lightly.		√	√	√	√	√
15		**Shift pedal pivot shaft**	• Apply lithium-soap-based grease lightly.		√	√	√	√	√
16	*	**Centerstand and sidestand pivots**	• Check operation. • Apply lithium-soap-based grease lightly.		√	√	√	√	√
17	*	**Sidestand switch**	• Check operation and replace if necessary.	√	√	√	√	√	√
18	*	**Front fork**	• Check operation and for oil leakage. • Replace if necessary.		√	√	√	√	√
19	*	**Shock absorber assembly**	• Check operation and for oil leakage. • Replace if necessary.		√	√	√	√	√
20	*	**Rear suspension link pivots**	• Apply lithium-soap-based grease lightly.					√	
21		**Engine oil**	• Change (warm engine before draining).	√	√	√	√	√	√
22	*	**Engine oil filter cartridge**	• Replace.	√		√		√	
23	*	**Cooling system**	• Check hoses for cracks or damage. • Replace if necessary.		√	√	√	√	√
			• Change with ethylene glycol anti-freeze coolant every 24 months.					Change.	
24	*	**Final gear oil**	• Check oil level and for leakage. • Change at initial 600 mi (1000 km) or 1 month, and thereafter every 16000 mi (25000 km) or 24 months.	Change.		√		Change.	
25	*	**Front and rear brake switches**	• Check operation.	√	√	√	√	√	√
26	*	**Control cables**	• Apply Yamaha chain and cable lube or engine oil SAE 10W-30 thoroughly.	√	√	√	√	√	√

No.		ITEM	ROUTINE	INITIAL	ODOMETER READINGS				
				600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
27	*	**Throttle grip housing and cable**	• Check operation and free play. • Adjust the throttle cable free play if necessary. • Lubricate the throttle grip housing and cable.		√	√	√	√	√
28	*	**Lights, signals and switches**	• Check operation. • Adjust headlight beam.	√	√	√	√	√	√

* Since these items require special tools, data and technical skills, have a Yamaha dealer perform the service.

TIP

From 24000 mi (37000 km) or 36 months, repeat the maintenance intervals starting from 8000 mi (13000 km) or 12 months.

EAU17660

TIP

- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.
- Hydraulic brake and clutch systems
  - After disassembling the brake or clutch master cylinders, caliper cylinders or clutch release cylinder, always change the fluid. Regularly check the brake and clutch fluid levels and fill the reservoirs as required.
  - Replace the oil seals on the inner parts of the brake or clutch master cylinders, caliper cylinders and clutch release cylinder every two years.
  - Replace the brake and clutch hoses every four years or if cracked or damaged.

ET3P6G001

PERIODIC MAINTENANCE CHART FOR THE EMISSION CONTROL SYSTEM (FJR13AE)

No.		ITEM	ROUTINE	INITIAL	ODOMETER READINGS				
				600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
1	*	**Fuel line**	• Check fuel hoses for cracks or damage. • Replace if necessary.		√	√	√	√	√
2	*	**Spark plugs**	• Check condition. • Adjust gap and clean. • Replace every 8000 mi (13000 km) or 12 months.		√	Replace.	√	Replace.	√
3	*	**Valve clearance**	• Check and adjust valve clearance when engine is cold.	Every 26600 mi (42000 km)					
4	*	**Crankcase breather system**	• Check breather hose for cracks or damage. • Replace if necessary.		√	√	√	√	√
5	*	**Fuel injection**	• Check and adjust engine idle speed and synchronization.	√	√	√	√	√	√
6	*	**Exhaust system**	• Check for leakage. • Tighten if necessary. • Replace gasket(s) if necessary.		√	√	√	√	√
7	*	**Evaporative emission control system (For California only)**	• Check control system for damage. • Replace if necessary.				√		

No.		ITEM	ROUTINE	INITIAL	ODOMETER READINGS				
				600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
8	*	**Air induction system**	• Check the air cut-off valve, reed valve, and hose for damage. • Replace any damaged parts.			√		√	

* Since these items require special tools, data and technical skills, have a Yamaha dealer perform the service.

ET3P6G002

GENERAL MAINTENANCE AND LUBRICATION CHART (FJR13AE)

No.		ITEM	ROUTINE	INITIAL	ODOMETER READINGS				
				600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
1	*	**Air filter element**	• Clean with compressed air. • Replace if necessary.		√	√	√	√	√
2	*	**YCC-S clutch**	• Check operation, fluid level, and for fluid leakage.	√	√	√	√	√	√
3	*	**Front brake**	• Check operation, fluid level, and for fluid leakage. • Replace brake pads if necessary.	√	√	√	√	√	√
4	*	**Rear brake**	• Check operation, fluid level, and for fluid leakage. • Replace brake pads if necessary.	√	√	√	√	√	√
5	*	**Brake hoses**	• Check for cracks or damage.		√	√	√	√	√
			• Replace.	Every 4 years					
6	*	**Wheels**	• Check runout and for damage. • Replace if necessary.		√	√	√	√	√
7	*	**Tires**	• Check tread depth and for damage. • Replace if necessary. • Check air pressure. • Correct if necessary.		√	√	√	√	√
8	*	**Wheel bearings**	• Check bearings for smooth operation. • Replace if necessary.		√	√	√	√	√
9	*	**Swingarm pivot bearings**	• Check bearing assemblies for looseness. • Moderately repack with lithium-soap-based grease.			√		Repack.	
10	*	**Steering bearings**	• Check bearing assemblies for looseness. • Moderately repack with lithium-soap-based grease every 16000 mi (25000 km) or 24 months.	√	√	√	√	Repack.	√
11	*	**Chassis fasteners**	• Check all chassis fitting and fasteners. • Correct if necessary.		√	√	√	√	√
12		**Brake lever pivot shaft**	• Apply silicone grease lightly.		√	√	√	√	√
13		**Brake pedal pivot shaft**	• Apply lithium-soap-based grease lightly.		√	√	√	√	√
14		**Shift pedal pivot shaft**	• Apply lithium-soap-based grease lightly.		√	√	√	√	√
15	*	**Centerstand and sidestand pivots**	• Check operation. • Apply lithium-soap-based grease lightly.		√	√	√	√	√
16	*	**Sidestand switch**	• Check operation and replace if necessary.	√	√	√	√	√	√
17	*	**Front fork**	• Check operation and for oil leakage. • Replace if necessary.		√	√	√	√	√

No.		ITEM	ROUTINE	INITIAL	ODOMETER READINGS				
				600 mi (1000 km) or 1 month	4000 mi (7000 km) or 6 months	8000 mi (13000 km) or 12 months	12000 mi (19000 km) or 18 months	16000 mi (25000 km) or 24 months	20000 mi (31000 km) or 30 months
18	*	**Shock absorber assembly**	• Check operation and for oil leakage. • Replace if necessary.		√	√	√	√	√
19	*	**Rear suspension link pivots**	• Apply lithium-soap-based grease lightly.					√	
20		**Engine oil**	• Change (warm engine before draining).	√	√	√	√	√	√
21	*	**Engine oil filter cartridge**	• Replace.	√		√		√	
22	*	**Cooling system**	• Check hoses for cracks or damage. • Replace if necessary.		√	√	√	√	√
			• Change with ethylene glycol anti-freeze coolant every 24 months.					Change.	
23	*	**Final gear oil**	• Check oil level and for leakage. • Change at initial 600 mi (1000 km) or 1 month, and thereafter every 16000 mi (25000 km) or 24 months.	Change.		√		Change.	
24	*	**Front and rear brake switches**	• Check operation.	√	√	√	√	√	√
25	*	**Control cables**	• Apply Yamaha chain and cable lube or engine oil SAE 10W-30 thoroughly.	√	√	√	√	√	√
26	*	**Throttle grip housing and cable**	• Check operation and free play. • Adjust the throttle cable free play if necessary. • Lubricate the throttle grip housing and cable.		√	√	√	√	√
27	*	**Lights, signals and switches**	• Check operation. • Adjust headlight beam.	√	√	√	√	√	√

* Since these items require special tools, data and technical skills, have a Yamaha dealer perform the service.

TIP

From 24000 mi (37000 km) or 36 months, repeat the maintenance intervals starting from 8000 mi (13000 km) or 12 months.

ET3P6G003

TIP

- The air filter needs more frequent service if you are riding in unusually wet or dusty areas.
- Hydraulic brake and YCC-S clutch systems
  - After disassembling the brake or YCC-S clutch master cylinders, caliper cylinders or YCC-S clutch release cylinder, always change the fluid. Regularly check the brake and YCC-S clutch fluid levels and fill the reservoirs as required.
  - Replace the oil seals on the inner parts of the brake or YCC-S clutch master cylinders, caliper cylinders and YCC-S clutch release cylinder every two years.
  - Replace the brake and YCC-S clutch hoses every four years or if cracked or damaged.

EAS20470
ENGINE

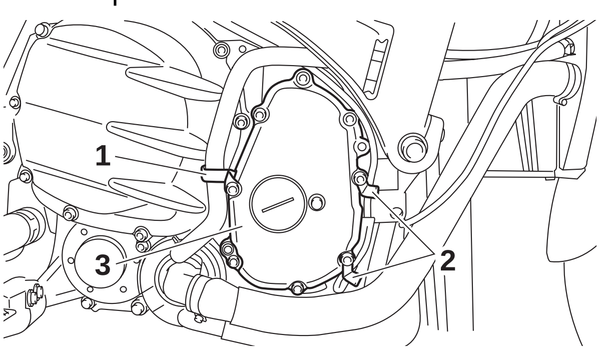
EAS20490
ADJUSTING THE VALVE CLEARANCE

The following procedure applies to all of the valves.

TIP

- Valve clearance adjustment should be made on a cold engine, at room temperature.
- When the valve clearance is to be measured or adjusted, the piston must be at top dead center (TDC) on the compression stroke.

1. Remove:
   - Rider seat
   - Right side cowling
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 7-1.
   - T-bar
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Air cut-off valve
     Refer to “AIR INDUCTION SYSTEM” on page 7-11.
   - Thermostat inlet pipe 1
     Refer to “THERMOSTAT” on page 6-6.
2. Disconnect:
   - Throttle cables
3. Remove:
   - Spark plugs
   - Cylinder head cover
   - Cylinder head cover gasket
     Refer to “CAMSHAFTS” on page 5-13.
4. Remove:
   - Hose holder “1”
   - Lead holders “2”
   - Pickup rotor cover “3”



5. Measure:
   - Valve clearance
     Out of specification → Adjust.

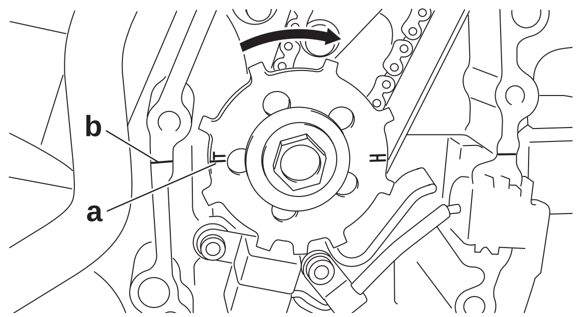
Valve clearance (cold)
Intake
0.15–0.22 mm (0.0059–0.0087 in)
Exhaust
0.18–0.25 mm (0.0071–0.0098 in)

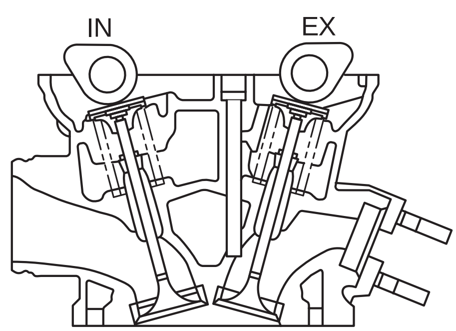
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a. Turn the crankshaft clockwise.
b. When piston #1 is at TDC on the compression stroke, align the TDC mark “a” on the pickup rotor with the crankcase mating surface “b”.

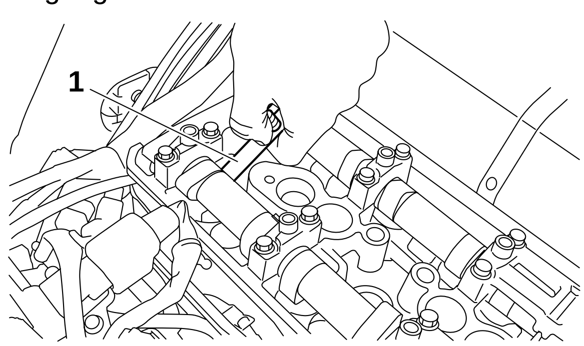
TIP

TDC on the compression stroke can be found when the camshaft lobes are turned away from each other.





c. Measure the valve clearance with a thickness gauge “1”.

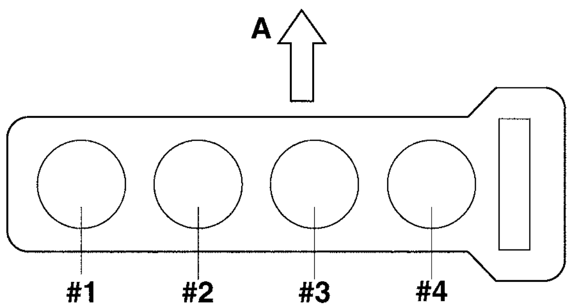


TIP

- If the valve clearance is incorrect, record the measured reading.

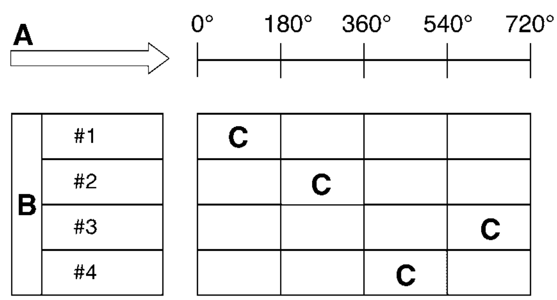
- Measure the valve clearance in the following sequence.

Valve clearance measuring sequence **Cylinder #1 → #2 → #4 → #3**



A. Front

d. To measure the valve clearances of the other cylinders, starting with cylinder #1 at TDC, turn the crankshaft clockwise as specified in the following table.



A. Degrees that the crankshaft is turned clockwise
B. Cylinder
C. Combustion cycle

Cylinder #2	180°
Cylinder #4	360°
Cylinder #3	540°

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6. Remove:
   - Camshafts

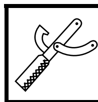
TIP

- Refer to “CAMSHAFTS” on page 5-13.
- When removing the timing chain and camshafts, fasten the timing chain with a wire to retrieve it if it falls into the crankcase.

7. Adjust:
   - Valve clearance

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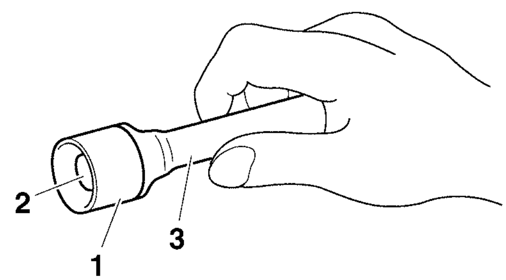
a. Remove the valve lifter “1” and the valve pad “2” with a valve lapper “3”.

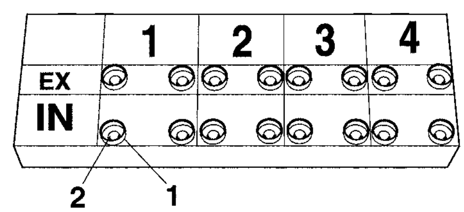


Valve lapper
90890-04101
Valve lapping tool
YM-A8998

TIP

- Cover the timing chain opening with a rag to prevent the valve pad from falling into the crankcase.
- Make a note of the position of each valve lifter “1” and valve pad “2” so that they can be installed in the correct place.



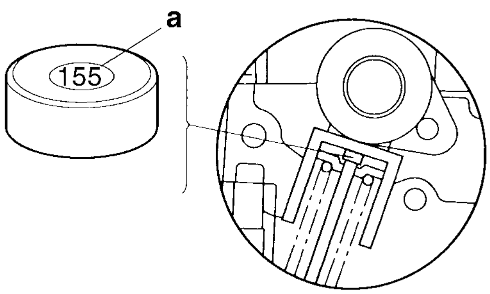


b. Calculate the difference between the specified valve clearance and the measured valve clearance.
   Example:
   Specified valve clearance = 0.15–0.22 mm (0.0059–0.0087 in)
   Measured valve clearance = 0.25 mm (0.0098 in)
   0.25 mm (0.0098 in) - 0.22 mm (0.0087 in) = 0.03 mm (0.001 in)
c. Check the thickness of the current valve pad.

TIP

The thickness “a” of each valve pad is marked in hundredths of millimeters on the side that touches the valve lifter.

Example:
If the valve pad is marked “155”, the pad thickness is 1.55 mm (0.061 in).



d. Calculate the sum of the values obtained in steps (b) and (c) to determine the required valve pad thickness and the valve pad number.
Example:
1.55 mm (0.061 in) + 0.03 mm (0.001 in) = 1.58 mm (0.062 in)
The valve pad number is 158.

e. Round off the valve pad number according to the following table, and then select the suitable valve pad.

Last digit	Rounded value
0, 1, 2	0
3, 4, 5, 6	5
7, 8, 9	10

TIP

Refer to the following table for the available valve pads.

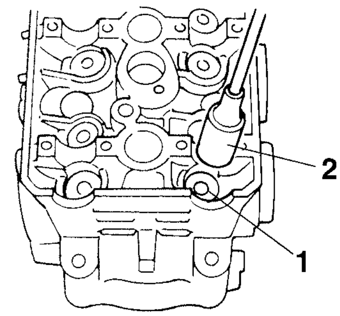
Valve pad range	Nos. 120–240
Valve pad thickness	1.20–2.40 mm (0.0472–0.0945 in)
Available valve pads	25 thicknesses in 0.05 mm (0.002 in) increments

Example:
Valve pad number = 158
Rounded value = 160
New valve pad number = 160

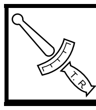
f. Install the new valve pad “1” and the valve lifter “2”.

TIP

- Lubricate the valve lifter with engine oil.
- The valve lifter must turn smoothly when rotated by hand.
- Install the valve lifter and the valve pad in the correct place.



g. Install the exhaust and intake camshafts, timing chain and camshaft caps.

	**Camshaft cap bolt** **10 Nm (1.0 m·kg, 7.2 ft·lb)**

TIP

- Refer to “CAMSHAFTS” on page 5-13.
- Lubricate the camshaft bearings, camshaft lobes and camshaft journals.
- First, install the exhaust camshaft.
- Turn the crankshaft clockwise several full turns to seat the parts.

h. Measure the valve clearance again.

i. If the valve clearance is still out of specification, repeat all of the valve clearance adjustment steps until the specified clearance is obtained.

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8. Install:
   - All removed parts

TIP

For installation, reverse the removal procedure.

9. Adjust:
   - Throttle cable free play
     Refer to “ADJUSTING THE THROTTLE CABLE FREE PLAY” on page 3-10.

EAS20570

SYNCHRONIZING THE THROTTLE BODIES

TIP

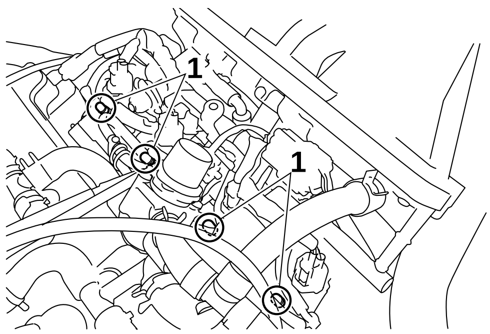
Prior to synchronizing the throttle bodies, the valve clearance and the engine idling speed should be properly adjusted and the ignition timing should be checked.

1. Stand the vehicle on a level surface.

TIP

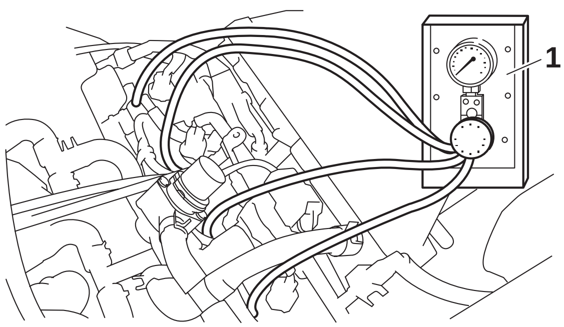
Place the vehicle on the centerstand.

2. Remove:
   - Rider seat
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 7-1.
   - T-bar
     Refer to “GENERAL CHASSIS” on page 4-1.
3. Remove:
   - Caps “1”



4. Install:
   - Vacuum gauge “1”
   - Digital tachometer

	Vacuum gauge **90890-03094** **Carburetor synchronizer** **YU-44456**



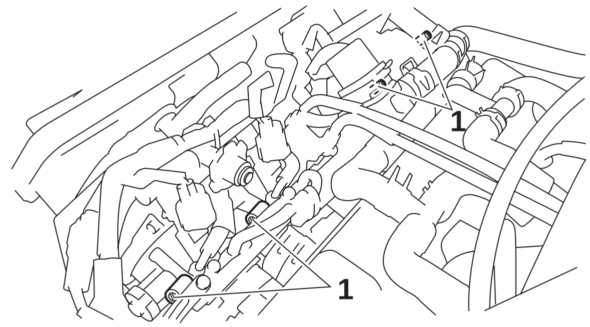
5. Install:
   - Fuel tank
6. Start the engine and let it warm up for several minutes.
7. Measure:
   - Engine idling speed
     Out of specification → Adjust.
     Refer to “ADJUSTING THE ENGINE IDLING SPEED” on page 3-10.

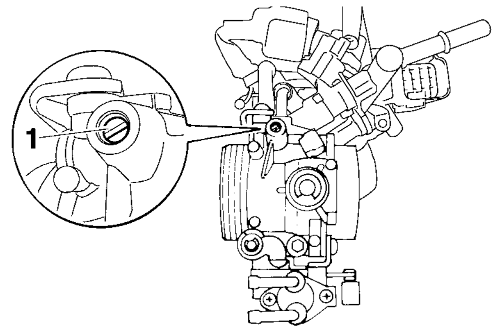
	Engine idling speed **1000–1100 r/min**

8. Adjust:
   - Throttle body synchronization

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a. With throttle body #3 as standard, adjust throttle bodies #1, #2, and #4 using the air screw “1”.





TIP

- After each step, rev the engine two or three times, each time for less than a second, and check the synchronization again.
- If the air screw was removed, turn the screw 3/4 turn in and be sure to synchronize the throttle body.

ECA14900

NOTICE

Do not use the throttle valve adjusting screws to adjust the throttle body synchronization.

	Vacuum gauge **90890-03094** **Carburetor synchronizer** **YU-44456**

	Intake vacuum **33.3 kPa (9.8 inHg) (250 mmHg)**

TIP

The difference in vacuum pressure between two throttle bodies should not exceed 1.33 kPa (0.39 inHg) (10 mmHg).

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9. Measure:
   - Engine idling speed
     Out of specification → Adjust.
     Make sure that the vacuum pressure is within specification.
10. Stop the engine and remove the measuring equipment.
11. Adjust:
    - Throttle cable free play
      Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY" on page 3-10.

	Throttle cable free play **3.0–5.0 mm (0.12–0.20 in)**

12. Install:
    - Caps
13. Install:
    - T-bar
    - Rider seat
      Refer to "GENERAL CHASSIS" on page 4-1.

EAS20610

ADJUSTING THE ENGINE IDLING SPEED

TIP

Prior to adjusting the engine idling speed, the throttle body synchronization should be adjusted properly, the air filter element should be clean, and the engine should have adequate compression.

1. Start the engine and let it warm up for several minutes.
2. Remove:
   - Right side cowling
   - Rider seat
     Refer to "GENERAL CHASSIS" on page 4-1.
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
   - T-bar
     Refer to "GENERAL CHASSIS" on page 4-1.
3. Install:
   - Digital tachometer
     (onto the spark plug lead of cylinder #1)
4. Install:
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
5. Check:
   - Engine idling speed
     Out of specification → Adjust.

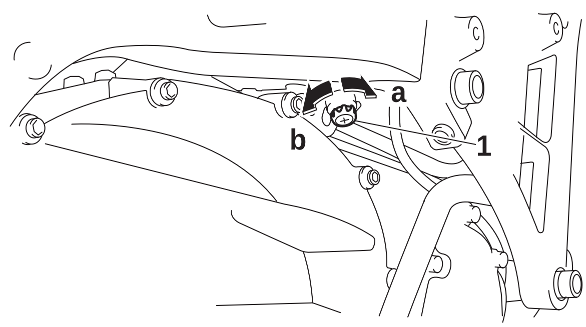
	Engine idling speed **1000–1100 r/min**

6. Adjust:
   - Engine idling speed

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a. Turn the engine idle speed adjustment screw "1" in direction "a" or "b" until the specified engine idling speed is obtained.

> **Direction "a"**
> **Engine idling speed is increased.**
> **Direction "b"**
> **Engine idling speed is decreased.**



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7. Adjust:
   - Throttle cable free play
     Refer to "ADJUSTING THE THROTTLE CABLE FREE PLAY" on page 3-10.

	Throttle cable free play **3.0–5.0 mm (0.12–0.20 in)**

8. Install:
   - T-bar
   - Rider seat
   - Right side cowling
     Refer to "GENERAL CHASSIS" on page 4-1.

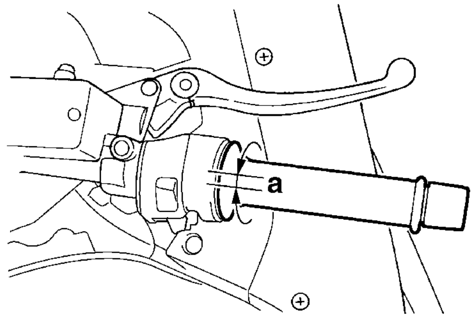
EAS20630

ADJUSTING THE THROTTLE CABLE FREE PLAY

TIP

Prior to adjusting the throttle cable free play, the engine idling speed and throttle body synchronization should be adjusted properly.

1. Check:
   - Throttle cable free play "a"
     Out of specification → Adjust.



Throttle cable free play 3.0–5.0 mm (0.12–0.20 in)

2. Remove:
   • Rider seat
   Refer to “GENERAL CHASSIS” on page 4-1.
   • Fuel tank
   Refer to “FUEL TANK” on page 7-1.
   • T-bar
   Refer to “GENERAL CHASSIS” on page 4-1.
3. Adjust:
   • Throttle cable free play

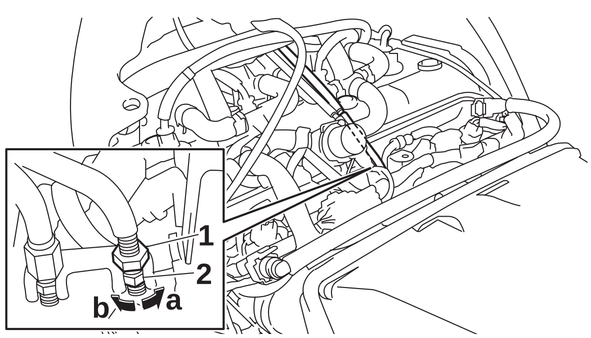
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Throttle body side

a. Loosen the locknut “1” on the accelerator cable.
b. Turn the adjusting nut “2” in direction “a” or “b” until the specified throttle cable free play is obtained.

Direction “a” **Throttle cable free play is increased.** **Direction “b”** **Throttle cable free play is decreased.**

c. Tighten the locknut.



TIP

If the specified throttle cable free play cannot be obtained on the throttle body side of the cable, use the adjusting nut on the handlebar side.

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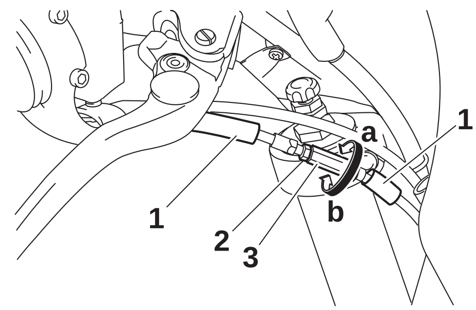
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Handlebar side

a. Slide back the rubber covers “1”.
b. Loosen the locknut “2”.
c. Turn the adjusting nut “3” in direction “a” or “b” until the specified throttle cable free play is obtained.

Direction “a” **Throttle cable free play is increased.** **Direction “b”** **Throttle cable free play is decreased.**

d. Tighten the locknut.
e. Slide the rubber covers to its original position.



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4. Install:
   • T-bar
   Refer to “GENERAL CHASSIS” on page 4-1.
   • Fuel tank
   Refer to “FUEL TANK” on page 7-1.
   • Rider seat
   Refer to “GENERAL CHASSIS” on page 4-1.

EAS20680

CHECKING THE SPARK PLUGS

The following procedure applies to all of the spark plugs.

1. Remove:
   • Rider seat
   Refer to “GENERAL CHASSIS” on page 4-1.
   • Fuel tank
   Refer to “FUEL TANK” on page 7-1.
   • T-bar
   Refer to “GENERAL CHASSIS” on page 4-1.
2. Disconnect:
   • Spark plug cap
3. Remove:
   • Spark plug

ECA13320

NOTICE

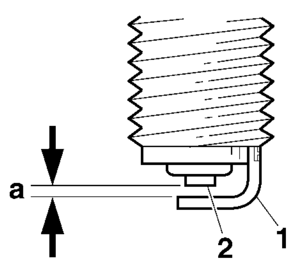
Before removing the spark plugs, blow away any dirt accumulated in the spark plug wells with compressed air to prevent it from falling into the cylinders.

4. Check:
   - Spark plug type
     Incorrect → Change.

	Manufacturer/model **NGK/CR8E** **Manufacturer/model** **DENSO/U24ESR-N**

5. Check:
   - Electrode "1"
     Damage/wear → Replace the spark plug.
   - Insulator "2"
     Abnormal color → Replace the spark plug.
     Normal color is medium-to-light tan.
6. Clean:
   - Spark plug
     (with a spark plug cleaner or wire brush)
7. Measure:
   - Spark plug gap "a"
     (with a wire thickness gauge)
     Out of specification → Regap.

	Spark plug gap **0.7–0.8 mm (0.028–0.031 in)**



8. Install:
   - Spark plug

	Spark plug **13 Nm (1.3 m·kg, 9.4 ft·lb)**

TIP

Before installing the spark plug, clean the spark plug and gasket surface.

9. Connect:
   - Spark plug
10. Install:
    - T-bar
      Refer to "GENERAL CHASSIS" on page 4-1.
    - Fuel tank
      Refer to "FUEL TANK" on page 7-1.
    - Rider seat
      Refer to "GENERAL CHASSIS" on page 4-1.

EAS20700

CHECKING THE IGNITION TIMING

TIP

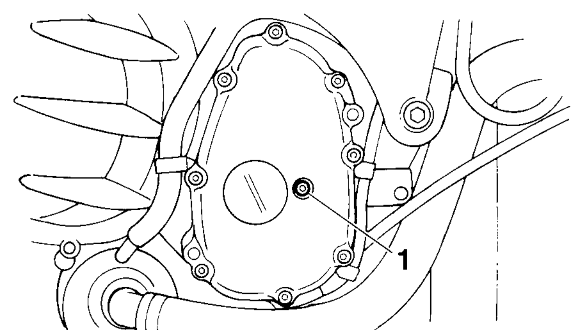
Prior to checking the ignition timing, check the wiring connections of the entire ignition system. Make sure all connections are tight and free of corrosion.

1. Stand the vehicle on a level surface.

TIP

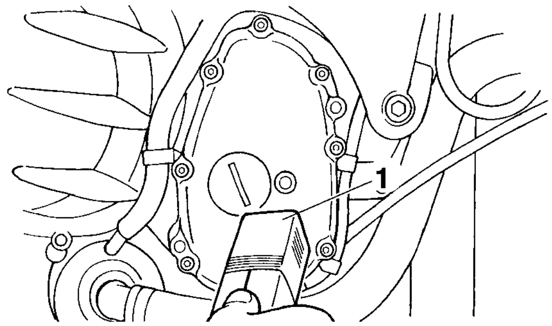
Place the vehicle on the centerstand.

2. Remove:
   - Right side cowling
   - Rider seat
     Refer to "GENERAL CHASSIS" on page 4-1.
   - Fuel tank
     Refer to "FUEL TANK" on page 7-1.
   - T-bar
     Refer to "GENERAL CHASSIS" on page 4-1.
3. Remove:
   - Timing mark accessing plug "1"
     (along with the copper washer)



4. Connect:
   - Timing light "1"
     (onto the spark plug lead of cylinder #1)
   - Digital tachometer
     (onto the spark plug lead of cylinder #1)

	Timing light **90890-03141** **Inductive clamp timing light** **YU-03141**



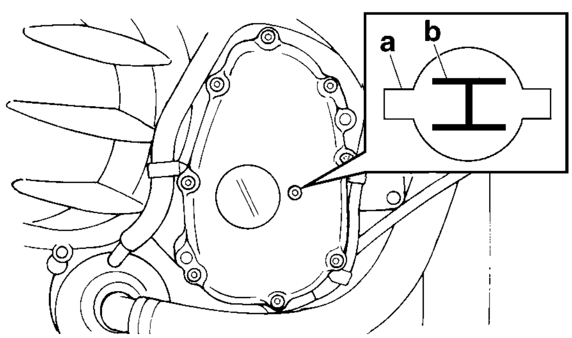
5. Install:
   - Fuel tank
     Refer to “FUEL TANK” on page 7-1.
6. Check:
   - Ignition timing

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a. Start the engine, warm it up for several minutes, and then let it run at the specified engine idling speed.

	Engine idling speed **1000–1100 r/min**

b. Check that pointer “a” on the pickup rotor cover is within the firing range “b” on the pickup rotor.
   Incorrect firing range → Check the ignition system.



TIP

The ignition timing is not adjustable.

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7. Tighten:
   - Timing mark accessing plug
     (along with the copper washer **New**)

	Timing mark accessing plug **15 Nm (1.5 m·kg, 11 ft·lb)**

8. Install:
   - T-bar
   - Rider seat
   - Right side cowling
     Refer to “GENERAL CHASSIS” on page 4-1.

EAS20710

MEASURING THE COMPRESSION PRESSURE

The following procedure applies to all of the cylinders.

TIP

Insufficient compression pressure will result in a loss of performance.

1. Measure:
   - Valve clearance
     Out of specification → Adjust.
     Refer to “ADJUSTING THE VALVE CLEARANCE” on page 3-6.
2. Start the engine, warm it up for several minutes, and then turn it off.
3. Remove:
   - Rider seat
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 7-1.
   - T-bar
     Refer to “GENERAL CHASSIS” on page 4-1.
4. Disconnect the all spark plug caps.
5. Remove:
   - Spark plug

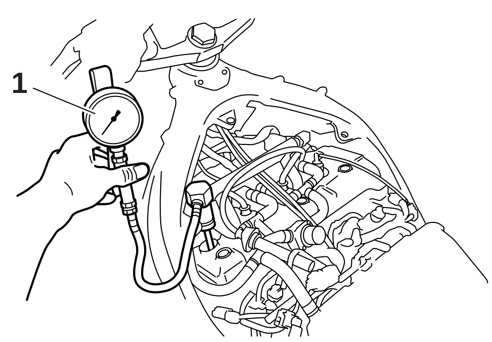
ECA13340

NOTICE

Before removing the spark plugs, use compressed air to blow away any dirt accumulated in the spark plug wells to prevent it from falling into the cylinders.

6. Install:
   - Compression gauge “1”

	Compression gauge **90890-03081** **Engine compression tester** **YU-33223**



7. Measure:
   - Compression pressure
     Out of specification → Refer to steps (c) and (d).

Standard compression pressure (at sea level)
1600 kPa/400 r/min (227.6 psi/400 r/min) (16.0 kgf/cm²/400 r/min)
Minimum–maximum
1390–1790 kPa (197.7–254.6 psi) (13.9–17.9 kgf/cm²)

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a. Set the main switch to “ON”.
b. With the throttle wide open, crank the engine until the reading on the compression gauge stabilizes.

TIP

The difference in compression pressure between cylinders should not exceed 100 kPa (1 kg/cm², 14 psi).

---

c. If the compression pressure is above the maximum specification, check the cylinder head, valve surfaces and piston crown for carbon deposits.
   Carbon deposits → Eliminate.
d. If the compression pressure is below the minimum specification, pour a teaspoonful of engine oil into the spark plug bore and measure again.
   Refer to the following table.

Compression pressure (with oil applied into the cylinder)	
Reading	Diagnosis
Higher than without oil	Piston ring(s) wear or damage → Repair.
Same as without oil	Pistons, valves, cylinder head gasket or piston ring(s) possibly defective → Repair.

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8. Install:
   - Spark plug

Spark plug
13 Nm (1.3 m·kg, 9.4 ft·lb)

9. Connect the all spark plug caps.
10. Install:
   - T-bar
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 7-1.
   - Rider seat
     Refer to “GENERAL CHASSIS” on page 4-1.

EAS20730

CHECKING THE ENGINE OIL LEVEL

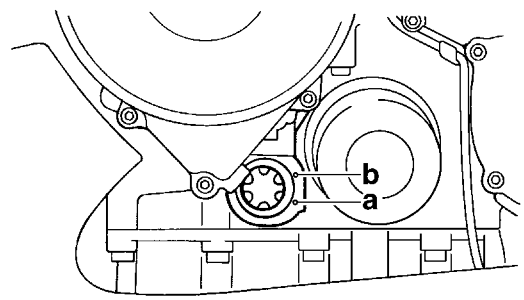
1. Stand the vehicle on a level surface.

TIP

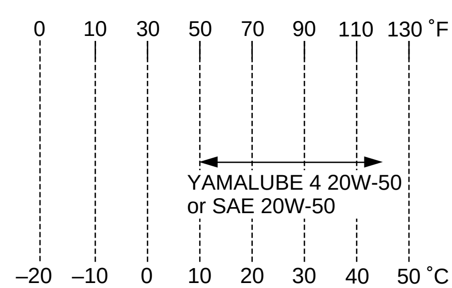
- Place the vehicle on the centerstand.
- Make sure the vehicle is upright.

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2. Start the engine, warm it up for several minutes, and then turn it off.
3. Check:
   - Engine oil level
     The engine oil level should be between the minimum level mark “a” and maximum level mark “b”.
     Below the minimum level mark → Add the recommended engine oil to the proper level.



Type
YAMALUBE 4 20W-50 or SAE 20W-50
Recommended engine oil grade
API service SG type or higher, JASO standard MA

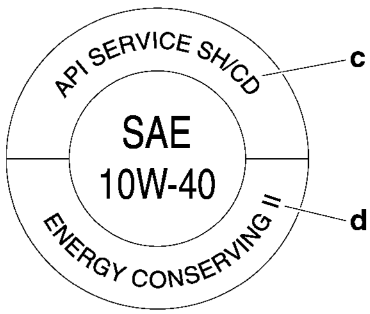


ECA3P6D021

NOTICE

- **Engine oil also lubricates the clutch and the wrong oil types or additives could cause clutch slippage. Therefore, do not add any chemical additives or use engine oils with a**

grade of CD "c" or higher and do not use oils labeled "ENERGY CONSERVING II" "d".
- **Do not allow foreign materials to enter the crankcase.**



TIP

Before checking the engine oil level, wait a few minutes until the oil has settled.

4. Start the engine, warm it up for several minutes, and then turn it off.
5. Check the engine oil level again.

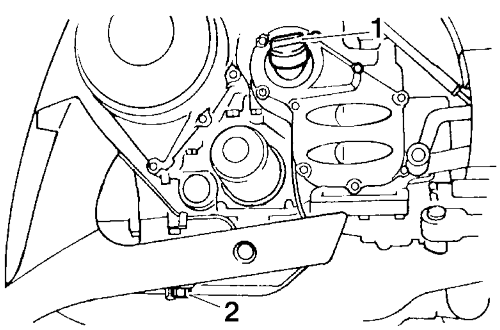
TIP

Before checking the engine oil level, wait a few minutes until the oil has settled.

EAS20780

CHANGING THE ENGINE OIL

1. Start the engine, warm it up for several minutes, and then turn it off.
2. Place a container under the engine oil drain bolt.
3. Remove:
   - Engine oil filler cap "1"
   - Engine oil drain bolt "2"
     (along with the gasket)



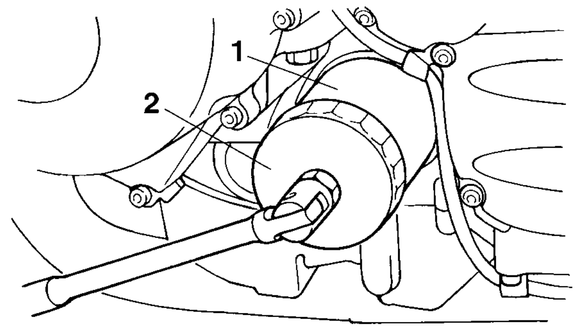
4. Drain:
   - Engine oil
     (completely from the crankcase)

5. If the oil filter cartridge is also to be replaced, perform the following procedure.

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a. Remove the oil filter cartridge "1" with an oil filter wrench "2".

	Oil filter wrench **90890-01426** **YU-38411**

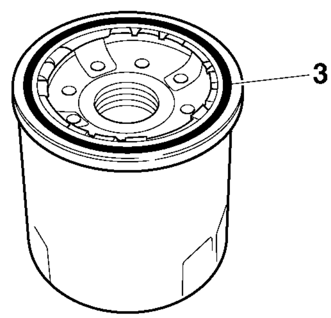


b. Lubricate the O-ring "3" of the new oil filter cartridge with a thin coat of engine oil.

ECA13390

NOTICE

Make sure the O-ring "3" is positioned correctly in the groove of the oil filter cartridge.



c. Tighten the new oil filter cartridge to specification with an oil filter wrench.

	Oil filter cartridge **17 Nm (1.7 m·kg, 12 ft·lb)**

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6. Install:
   - Engine oil drain bolt
     (along with the gasket New)

	Engine oil drain bolt **43 Nm (4.3 m·kg, 31 ft·lb)**

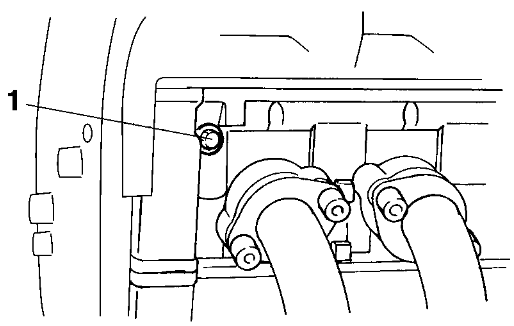
7. Fill:
   - Crankcase
     (with the specified amount of the recommended engine oil)

Engine oil quantity
Total amount
4.90 L (5.18 US qt) (4.31 Imp.qt)
Without oil filter cartridge replacement
3.80 L (4.02 US qt) (3.34 Imp.qt)
With oil filter cartridge replacement
4.00 L (4.23 US qt) (3.52 Imp.qt)

8. Install:
   - Engine oil filler cap
9. Start the engine, warm it up for several minutes, and then turn it off.
10. Check:
    - Engine
      (for engine oil leaks)
11. Check:
    - Engine oil level
      Refer to “CHECKING THE ENGINE OIL LEVEL” on page 3-14.
12. Check:
    - Engine oil pressure

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a. Remove the right side cowling. Refer to “GENERAL CHASSIS” on page 4-1.
b. Slightly loosen the engine oil check bolt “1”.



c. Start the engine and keep it idling until engine oil starts to seep from the oil gallery bolt. If no engine oil comes out after one minute, turn the engine off so that it will not seize.
d. Check the engine oil passages, the oil filter cartridge and the oil pump for damage or leakage. Refer to “OIL PUMP” on page 5-82.
e. Start the engine after solving the problem(s) and check the engine oil pressure again.
f. Tighten the oil gallery bolt to specification.

Engine oil check bolt
15 Nm (1.5 m·kg, 11 ft·lb)

g. Install the right side cowling. Refer to “GENERAL CHASSIS” on page 4-1.

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EAS20820

MEASURING THE ENGINE OIL PRESSURE

1. Check:
   - Engine oil level
     Below the minimum level mark → Add the recommended engine oil to the proper level.
2. Start the engine, warm it up for several minutes, and then turn it off.

ECA13410

NOTICE

When the engine is cold, the engine oil will have a higher viscosity, causing the engine oil pressure to increase. Therefore, be sure to measure the engine oil pressure after warming up the engine.

3. Remove:
   - Right side cowling
     Refer to “GENERAL CHASSIS” on page 4-1.
4. Remove:
   - Main gallery bolt

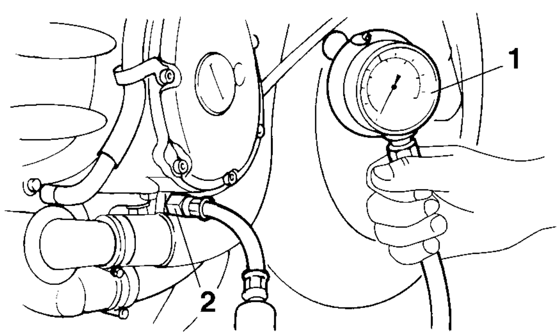
EWA12980

WARNING

The engine, muffler and engine oil are extremely hot.

5. Install:
   - Oil pressure gauge set “1”
   - Oil pressure adapter B “2”

Oil pressure gauge set
90890-03120
Oil pressure adapter B
90890-03124



6. Measure:
   - Engine oil pressure
     (at the following conditions)
     Out of specification → Adjust.

Oil pressure (hot)
30.0 kPa/1000 r/min (4.4 psi/1000 r/min) (0.30 kgf/cm²/1000 r/min)
Oil temperature
80.0–90.0 °C (176.00–194.00 °F)

Engine oil pressure	Possible causes
Below specification	• Faulty oil pump • Clogged oil filter • Leaking oil passage • Broken or damaged oil seal
Above specification	• Leaking oil passage • Faulty oil filter • Oil viscosity too high

7. Install:
   - Main gallery bolt

Main gallery bolt 12 Nm (1.2 m·kg, 8.7 ft·lb)

8. Install:
   - Right side cowling
     Refer to “GENERAL CHASSIS” on page 4-1.

EAS20860

ADJUSTING THE CLUTCH LEVER (FJR13A only)

1. Adjust:
   - Clutch lever position
     (distance “a” from the handlebar grip to the clutch lever)

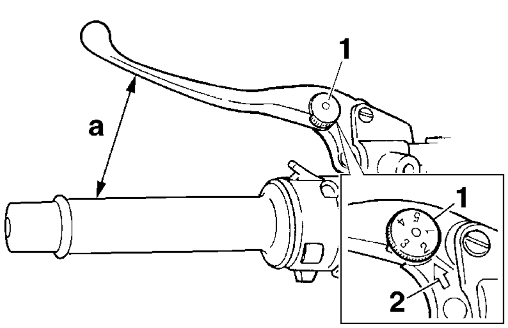
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a. While pushing the clutch lever forward, turn the adjusting dial “1” until the clutch lever is in the desired position.

TIP

Be sure to align the setting on the adjusting dial with the arrow mark “2” on the clutch lever holder.

Position #1 **Distance “a” is the largest.** **Position #5** **Distance “a” is the smallest.**



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EAS20890

CHECKING THE CLUTCH FLUID LEVEL (FJR13A)

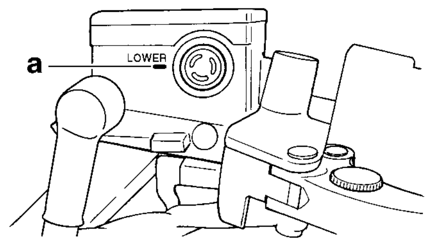
1. Stand the vehicle on a level surface.

TIP

Place the vehicle on the centerstand.

2. Check:
   - Clutch fluid level
     Below the minimum level mark “a” → Add the recommended clutch fluid to the proper level.

Recommended fluid **DOT 4**



EWA13370

WARNING

- **Use only the designated clutch fluid. Other clutch fluids may cause the rubber seals to deteriorate, causing leakage and poor clutch performance.**
- **Refill with the same type of clutch fluid that is already in the system. Mixing clutch fluids may result in a harmful chemical reaction, leading to poor clutch performance.**
- **When refilling, be careful that water does not enter the clutch fluid reservoir. Water will significantly lower the boiling point of the clutch fluid and could cause vapor lock.**

ECA13420

NOTICE

Clutch fluid may damage painted surfaces or plastic parts. Therefore, always clean up any spilt clutch fluid immediately.

TIP

In order to ensure a correct reading of the clutch fluid level, make sure the top of the reservoir is horizontal.

ET3P66026

CHECKING THE CLUTCH FLUID LEVEL (FJR13AE)

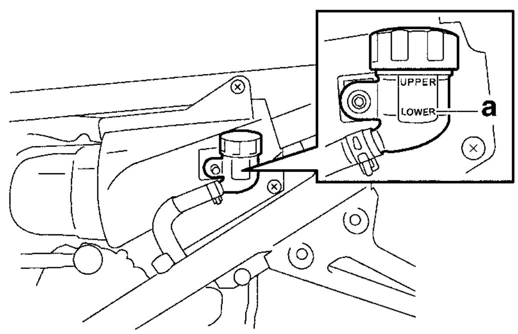
1. Stand the vehicle on a level surface.

TIP

Place the vehicle on the centerstand.

2. Remove:
   - Left side cover
   Refer to “GENERAL CHASSIS” on page 4-1.
3. Check:
   - Clutch fluid level
   Below the minimum level mark “a” → Add the recommended clutch fluid to the proper level.

Recommended fluid
DOT 4



EWA13370

WARNING

- **Use only the designated clutch fluid. Other clutch fluids may cause the rubber seals to deteriorate, causing leakage and poor clutch performance.**
- **Refill with the same type of clutch fluid that is already in the system. Mixing clutch fluids may result in a harmful chemical reaction, leading to poor clutch performance.**
- **When refilling, be careful that water does not enter the clutch fluid reservoir. Water will significantly lower the boiling point of the clutch fluid and could cause vapor lock.**

ECA13420

NOTICE

Clutch fluid may damage painted surfaces or plastic parts. Therefore, always clean up any spilt clutch fluid immediately.

TIP

In order to ensure a correct reading of the clutch fluid level, make sure the top of the reservoir is horizontal.

4. Install:
   - Left side cover
   Refer to “GENERAL CHASSIS” on page 4-1.

EAS20900

BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13A)

EWA13000

WARNING

Bleed the hydraulic clutch system whenever:
- **the system was disassembled,**
- **a clutch hose was loosened or removed,**
- **the clutch fluid level is very low,**
- **clutch operation is faulty.**

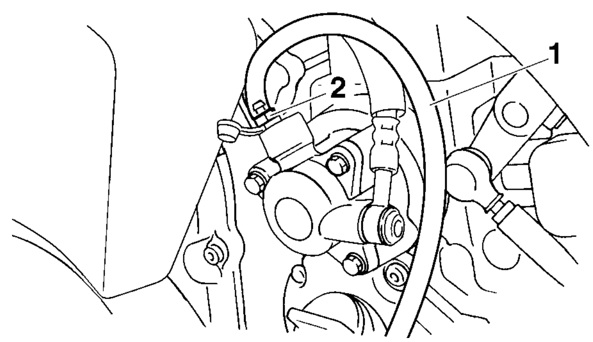
TIP

- Be careful not to spill any clutch fluid or allow the clutch master cylinder reservoir to overflow.
- When bleeding the hydraulic clutch system, make sure there is always enough clutch fluid before applying the clutch lever. Ignoring this precaution could allow air to enter the hydraulic clutch system, considerably lengthening the bleeding procedure.
- If bleeding is difficult, it may be necessary to let the clutch fluid settle for a few hours. Repeat the bleeding procedure when the tiny bubbles in the hose have disappeared.

1. Bleed:
   - Hydraulic clutch system

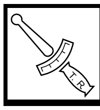
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a. Add the recommended clutch fluid to the proper level.
b. Install the clutch master cylinder reservoir diaphragm.
c. Connect a clear plastic hose “1” tightly to the bleed screw “2”.



d. Place the other end of the hose into a container.
e. Slowly squeeze the clutch lever several times.
f. Fully squeeze the clutch lever without releasing it.

g. Loosen the bleed screw. This will release the tension and cause the clutch lever to contact the handlebar grip.
h. Tighten the bleed screw and then release the clutch lever.
i. Repeat steps (e) to (h) until all of the air bubbles have disappeared from the clutch fluid in the plastic hose.
j. Tighten the bleed screw to specification.



Bleed screw
6 Nm (0.6 m·kg, 4.3 ft·lb)

k. Add the recommended clutch fluid to the proper level.
Refer to “CHECKING THE CLUTCH FLUID LEVEL (FJR13A)” on page 3-17.

EWA13010

WARNING

After bleeding the hydraulic clutch system, check the clutch operation.

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ET3P66027

BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)

EWA13000

WARNING

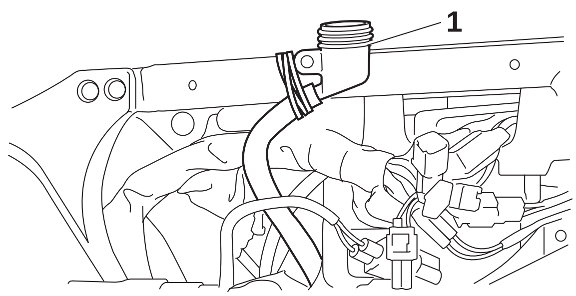
Bleed the hydraulic clutch system whenever:
- **the system was disassembled,**
- **a clutch hose was loosened or removed,**
- **the clutch fluid level is very low,**
- **clutch operation is faulty.**

TIP
- Before bleeding the hydraulic clutch system, shift the transmission into neutral to engage the clutch.
- Be careful not to spill any clutch fluid or allow the clutch fluid reservoir to overflow.
- When bleeding the hydraulic clutch system, make sure that there is always enough clutch fluid in the reservoir before pumping out the fluid using the vacuum/pressure gauge set. Ignoring this precaution could allow air to enter the hydraulic clutch system, considerably lengthening the bleeding procedure.
- If bleeding is difficult, it may be necessary to let the clutch fluid settle for a few hours. Repeat the bleeding procedure when the tiny bubbles in the hose have disappeared.

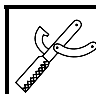
1. Remove:
   - Air filter case
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Rear wheel
     Refer to “REAR WHEEL” on page 4-25.
   - Swingarm
     Refer to “SWINGARM” on page 4-97.
2. Bleed:
   - Hydraulic clutch system

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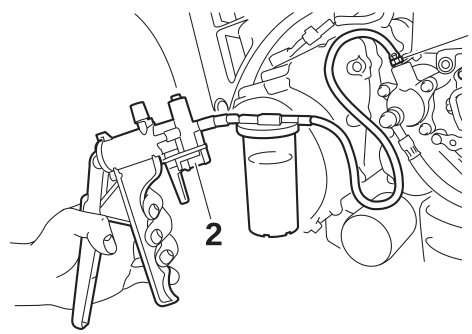
a. Fasten the clutch fluid reservoir “1” to the frame with a suitable strap, etc., as shown in the illustration so that it is not tilted.



b. Turn the main switch to “ON” and check that the transmission is in neutral.
c. Add the recommended clutch fluid to the proper level.
d. Install the clutch fluid reservoir diaphragm.
e. Connect the vacuum/pressure pump gauge set “2” tightly to the bleed screw “3”.



Vacuum/pressure pump gauge set
90890-06756
Mityvac brake bleeding tool
YS-42423

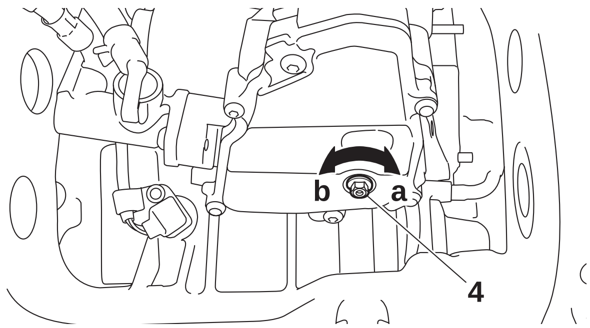


f. Loosen the bleed screw.
g. Pump out the clutch fluid using the vacuum/pressure pump gauge set.
h. Tighten the bleed screw.
i. Disengage the clutch by turning the manual clutch operation bolt “4” in direction “a” until it stops.
j. Loosen the bleed screw and then retighten it.

k. Engage the clutch by turning the manual clutch operation bolt in direction “b” until it stops.

TIP

The following illustration shows the manual clutch operation bolt when viewed from the rear of the vehicle with the swingarm removed.



l. Repeat steps (i) to (k) until all of the air bubbles have disappeared from the clutch fluid in the plastic hose of the vacuum/pressure pump gauge set.

m. Tighten the bleed screw to specification.

T.R.	**Bleed screw** **6 Nm (0.6 m·kg, 4.3 ft·lb)**

n. Manually engage and disengage the clutch 30 times using the manual clutch operation bolt.

o. Add the recommended clutch fluid to the proper level.
Refer to “CHECKING THE CLUTCH FLUID LEVEL (FJR13AE)” on page 3-18.

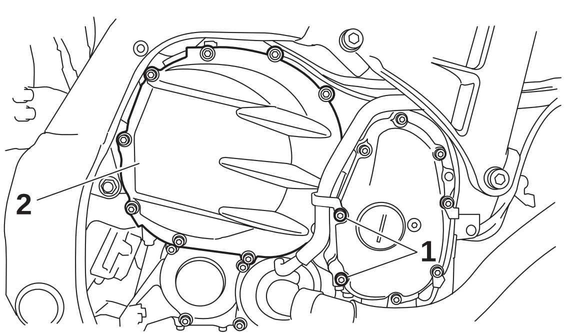
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3. Check:
   - Pressure plate stroke

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a. Remove the pickup rotor cover bolts “1”.

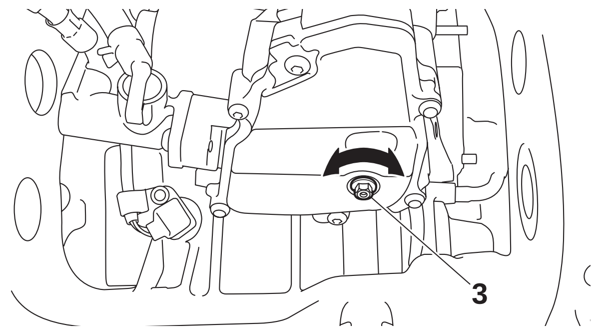
b. Remove the clutch cover “2”.
Refer to “CLUTCH” on page 5-46.



c. Manually engage and disengage the clutch using the clutch operation bolt “3” five times, each time for less than 1 second.

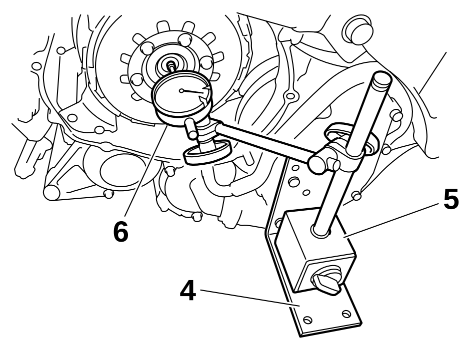
TIP

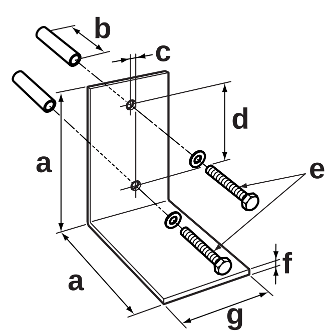
Turn the clutch operation bolt in a continuous motion, without allowing the pressure plate to stop in mid-stroke.



d. Install a suitable bracket “4”, the magnet base B “5” and the dial gauge & stand set “6”.

	Magnet base B **90890-06844** **Magnetic base stand** **YU-A8438** **Dial gauge & stand set** **90890-01252**





a. 100 mm (3.94 in)
b. 20 mm (0.79 in)
c. 1.5 mm (0.06 in)
d. 64 mm (2.52 in)
e. M6 × 40 mm bolt
f. 5 mm (0.20 in)
g. 60 mm (2.36 in)

e. Disengage the clutch by turning the manual clutch operation bolt.
f. Measure the clutch pressure plate stroke.

Clutch pressure plate stroke
FJR13AE 2.8 mm (0.11 in) or more

g. If the pressure plate stroke is out of specification, repeat steps (j) to (l) in the procedure for step “2. Bleed” until clutch pressure plate stroke is within specification.

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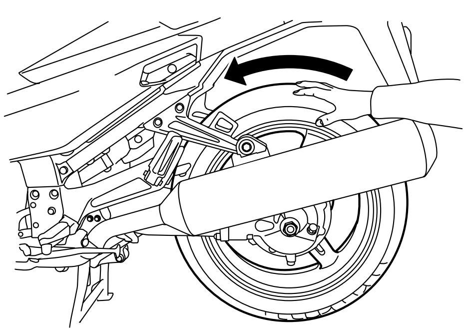
4. Install:
   - Swingarm
     Refer to “SWINGARM” on page 4-97.
   - Rear wheel
     Refer to “REAR WHEEL” on page 4-25.
   - Air filter case
     Refer to “GENERAL CHASSIS” on page 4-1.

ET3P66067
CHECKING THE VEHICLE AFTER BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE only)

1. Check:
   - Rear wheel drag torque
     Rear wheel does not rotate/drag torque does not progressively increase in the following order: neutral, 1st gear, and when rear wheel starts to rotate in 1st gear → Check the pressure plate stroke.
     Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)” on page 3-19.

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a. Place the vehicle on the centerstand.
b. Turn the main switch to “ON”.
c. Shift the transmission into neutral, and then rotate the rear wheel by hand.



d. Shift the transmission into 1st gear, and then rotate the rear wheel by hand.

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2. Check:
   - Shift operation
     Engine stalls → Check the pressure plate stroke.
     Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)” on page 3-19.

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a. Place the vehicle on the centerstand.
b. Start the engine.
c. Shift the transmission from neutral to 1st gear and back to neutral ten times.
d. Shift the transmission into 1st gear, and then apply the rear brake.

TIP

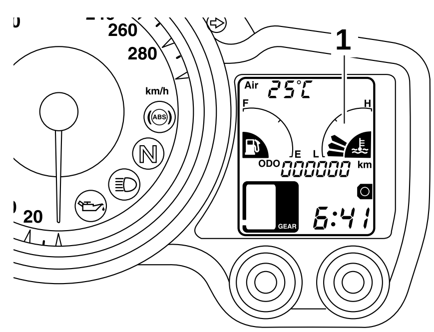
If the engine stalls, restart the engine, let it idle for at least 90 seconds, and then repeat steps (c) and (d).

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3. Check:
   - Starting-off performance of vehicle
     Abnormal vehicle vibration/abnormal starting-off performance/sudden acceleration compared to before the hydraulic clutch system was serviced → Select diagnostic code No. Sh_ _66 in the diagnostic mode and operate the hand shift lever switch (shift up) two times.
     Refer to “Diagnostic code table (Diagnostic code No. Sh_ _66)”.

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a. Place the vehicle on the centerstand.
b. Start the engine and warm it up until at least three segments appear on the coolant temperature meter “1” as shown in the illustration.



c. Shift the transmission into 1st gear, and then slowly turn the throttle grip and check that the rear wheel rotates.
d. Check that the transmission can be shifted into 2nd gear.

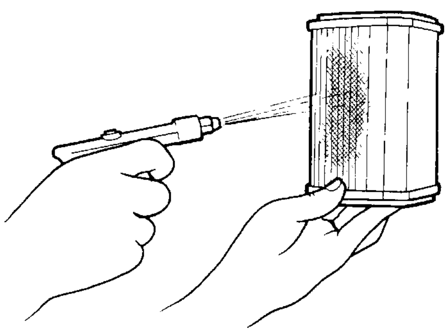
e. Shift the transmission into neutral, and then raise the centerstand.
f. Shift the transmission into 1st gear, and then slowly turn the throttle grip and check the starting-off performance of the vehicle.

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EAS20920

CLEANING THE AIR FILTER ELEMENT (FJR13A)

1. Remove:
   - Rider seat
   - Left side cover
   - Air filter case cover
   - Air filter element
     Refer to “GENERAL CHASSIS” on page 4-1.
2. Clean:
   - Air filter element
     Apply compressed air to the outer surface of the air filter element.



3. Check:
   - Air filter element
     Damage → Replace.

EC3P61043

NOTICE

Never operate the engine without the air filter element installed. Unfiltered air will cause rapid wear of engine parts and may damage the engine. Operating the engine without the air filter element will also affect throttle body synchronization, leading to poor engine performance and possible overheating.

4. Install:
   - Air filter element
   - Air filter case cover
   - Left side cover
   - Rider seat
     Refer to “GENERAL CHASSIS” on page 4-1.

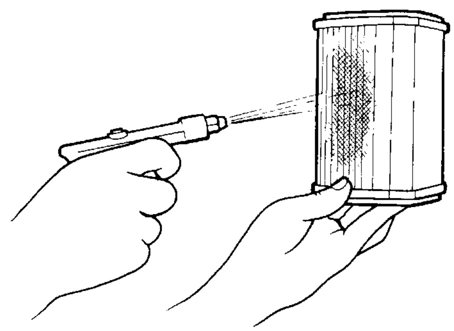
TIP

When installing the air filter element into the air filter case cover, make sure their sealing surfaces are aligned to prevent any air leaks.

ET3P66028

CLEANING THE AIR FILTER ELEMENT (FJR13AE)

1. Remove:
   - Rider seat
   - Left side cover
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Shift actuator
     Refer to “SHIFT ACTUATOR AND SHIFT ROD (FJR13AE only)” on page 5-73.
   - Air filter case cover
   - Air filter element
     Refer to “GENERAL CHASSIS” on page 4-1.
2. Clean:
   - Air filter element
     Apply compressed air to the outer surface of the air filter element.



3. Check:
   - Air filter element
     Damage → Replace.

EC3P61043

NOTICE

Never operate the engine without the air filter element installed. Unfiltered air will cause rapid wear of engine parts and may damage the engine. Operating the engine without the air filter element will also affect throttle body synchronization, leading to poor engine performance and possible overheating.

4. Install:
   - Air filter element
   - Air filter case cover
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Shift actuator
     Refer to “SHIFT ACTUATOR AND SHIFT ROD (FJR13AE only)” on page 5-73.
   - Left side cover
   - Rider seat
     Refer to “GENERAL CHASSIS” on page 4-1.

TIP

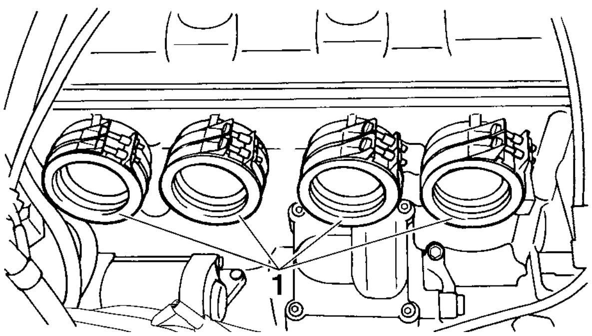
When installing the air filter element into the air filter case cover, make sure their sealing surfaces are aligned to prevent any air leaks.

EAS21010

CHECKING THE THROTTLE BODY JOINTS

The following procedure applies to all of the throttle body joints and intake manifolds.

1. Remove:
   - Rider seat
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 7-1.
   - Air filter case
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Throttle body
     Refer to “THROTTLE BODIES” on page 7-5.
2. Check:
   - Throttle body joints “1”
     Cracks/damage → Replace.



3. Install:
   - Throttle body
     Refer to “THROTTLE BODIES” on page 7-5.
   - Air filter case
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 7-1.
   - Rider seat
     Refer to “GENERAL CHASSIS” on page 4-1.

EAS21030

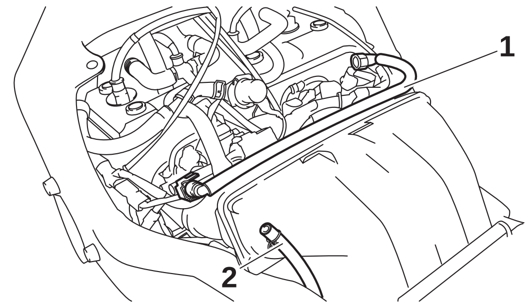
CHECKING THE FUEL LINE

1. Remove:
   - Rider seat
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 7-1.
   - T-bar
     Refer to “GENERAL CHASSIS” on page 4-1.
2. Check:
   - Fuel hose “1”
   - Fuel tank breather hose
   - Fuel tank overflow hose
   - Fuel tank breather/overflow hose “2” (except for California)
     Cracks/damage → Replace.
     Loose connection → Connect properly.

EC3P61005

NOTICE

Make sure the fuel tank breather/overflow hose is routed correctly.



3. Install:
   - T-bar
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 7-1.
   - Rider seat
     Refer to “GENERAL CHASSIS” on page 4-1.

EAS21070

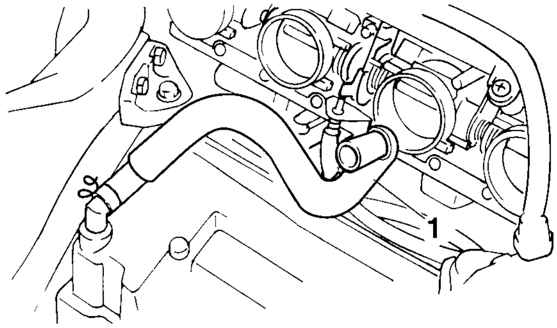
CHECKING THE CRANKCASE BREATHER HOSE

1. Remove:
   - Rider seat
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 7-1.
   - T-bar
   - Air filter case
     Refer to “GENERAL CHASSIS” on page 4-1.
2. Check:
   - Crankcase breather hose “1”
     Cracks/damage → Replace.
     Loose connection → Connect properly.

ECA13450

NOTICE

Make sure the crankcase breather hose is routed correctly.



3. Install:
   - Air filter case
   - T-bar
     Refer to “GENERAL CHASSIS” on page 4-1.
   - Fuel tank
     Refer to “FUEL TANK” on page 7-1.
   - Rider seat
     Refer to “GENERAL CHASSIS” on page 4-1.

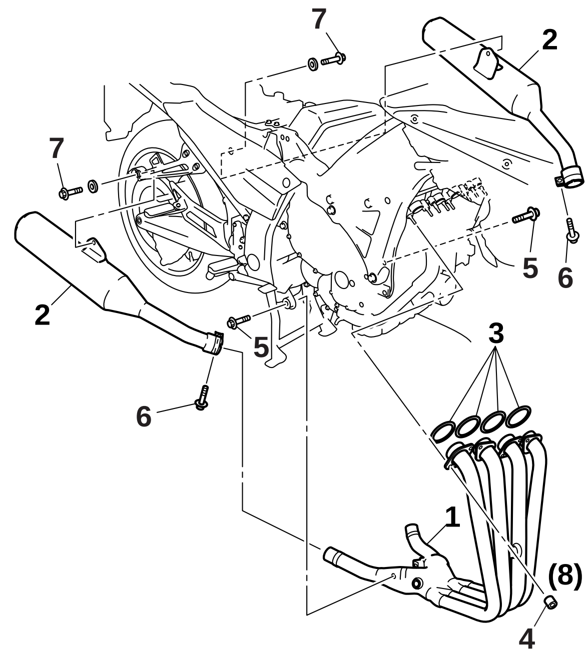
EAS21080

CHECKING THE EXHAUST SYSTEM

The following procedure applies to all of the exhaust pipes and gaskets.

1. Remove:
   - Side cowlings
     Refer to “GENERAL CHASSIS” on page 4-1.
2. Check:
   - Exhaust pipe assembly “1”
   - Mufflers “2”
     Cracks/damage → Replace.
   - Gasket “3”
     Exhaust gas leaks → Replace.
3. Check:
   - Tightening torque
   - Exhaust pipe assembly nuts “4”
   - Exhaust pipe assembly bolts “5”
   - Exhaust pipe assembly and muffler bolts “6”
   - Muffler bolts “7”

Exhaust pipe assembly nut
20 Nm (2.0 m·kg, 14 ft·lb)
Exhaust pipe assembly bolt
17 Nm (1.7 m·kg, 12 ft·lb)
Exhaust pipe assembly and muffler bolt
20 Nm (2.0 m·kg, 14 ft·lb)
Muffler bolt
25 Nm (2.5 m·kg, 18 ft·lb)



4. Install:
   - Side cowlings
     Refer to “GENERAL CHASSIS” on page 4-1.

EAS21090

CHECKING THE CANISTER (for California only)

1. Remove:
   - Side cowlings
     Refer to “GENERAL CHASSIS” on page 4-1.
2. Check:
   - Canister
   - Hoses
     Cracks/damage → Replace.
     Refer to “FUEL TANK” on page 7-1.
3. Install:
   - Side cowlings
     Refer to “GENERAL CHASSIS” on page 4-1.

EAS21110

CHECKING THE COOLANT LEVEL

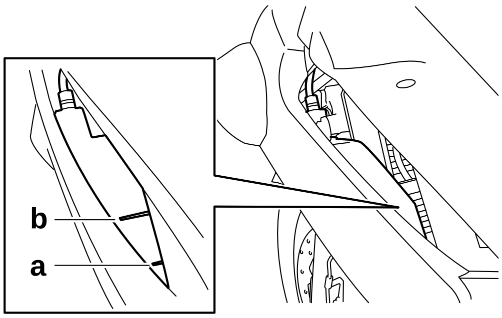
1. Stand the vehicle on a level surface.

TIP

- Place the vehicle on the centerstand.
- Make sure the vehicle is upright.

2. Remove:
   - Left side panel
     Refer to “GENERAL CHASSIS” on page 4-1.
3. Check:
   - Coolant level
     The coolant level should be between the minimum level mark “a” and maximum level mark “b”.

Below the minimum level mark → Add the recommended coolant to the proper level.



ECA13470

NOTICE

- **Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant check, and if necessary, correct the antifreeze concentration of the coolant.**
- **Use only distilled water. However, if distilled water is not available, soft water may be used.**

4. Start the engine, warm it up for several minutes, and then turn it off.
5. Check:
   - Coolant level

TIP

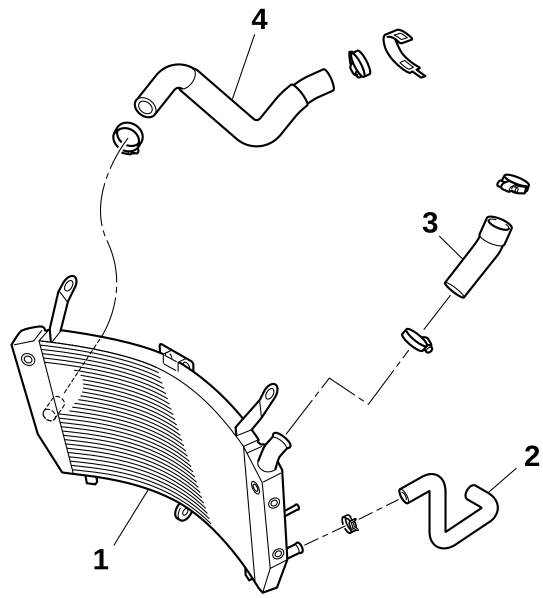
Before checking the coolant level, wait a few minutes until it settles.

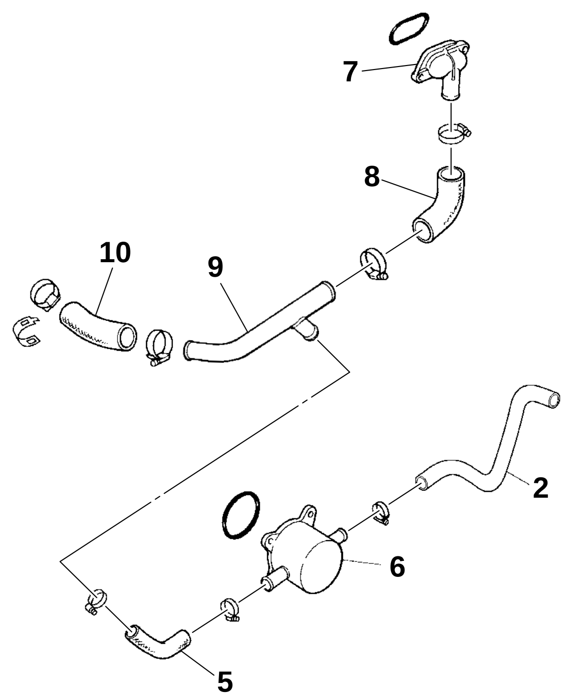
6. Install:
   - Left side panel
     Refer to "GENERAL CHASSIS" on page 4-1.

EAS21120

CHECKING THE COOLING SYSTEM

1. Remove:
   - Exhaust pipe assembly
     Refer to "ENGINE REMOVAL" on page 5-1.
2. Check:
   - Radiator "1"
   - Oil cooler outlet hose "2"
   - Radiator inlet hose "3"
   - Radiator outlet hose "4"
   - Oil cooler inlet hose "5"
   - Oil cooler "6"
   - Water jacket joint "7"
   - Water jacket joint inlet hose "8"
   - Water pump outlet pipe "9"
   - Water pump outlet hose "10"
     Cracks/damage → Replace.
     Refer to "RADIATOR" on page 6-1, "OIL COOLER" on page 6-4, "THERMOSTAT" on page 6-6 and "WATER PUMP" on page 6-10.



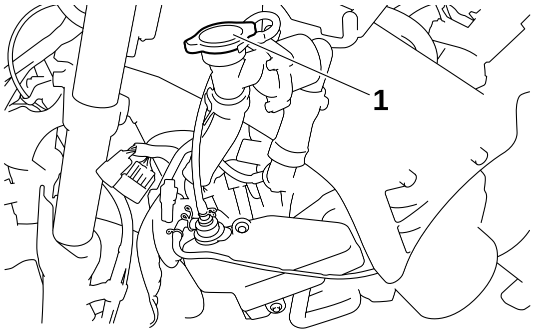


3. Install:
   - Exhaust pipe assembly
     Refer to "ENGINE REMOVAL" on page 5-1.

EAS21130

CHANGING THE COOLANT

1. Remove:
   - Front cowling
     Refer to "GENERAL CHASSIS" on page 4-1.
2. Remove:
   - Radiator cap "1"

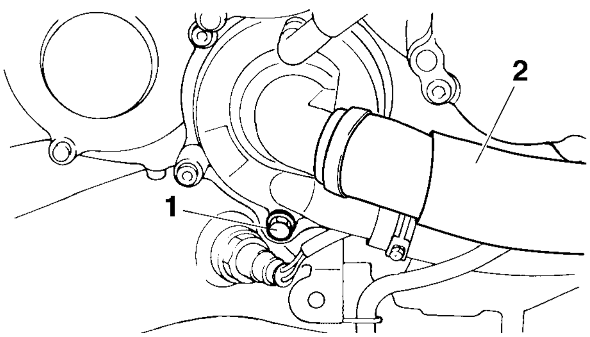


EWA13030

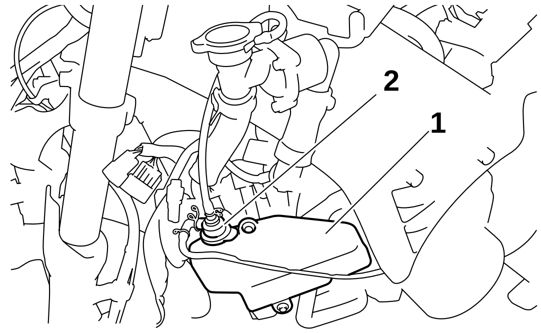
WARNING

A hot radiator is under pressure. Therefore, do not remove the radiator cap when the engine is hot. Scalding hot fluid and steam may be blown out, which could cause serious injury. When the engine has cooled, open the radiator cap as follows:
Place a thick rag or a towel over the radiator cap and slowly turn the radiator cap counterclockwise toward the detent to allow any residual pressure to escape. When the hissing sound has stopped, press down on the radiator cap and turn it counterclockwise to remove.

3. Remove:
   - Coolant drain bolt (water pump) “1” (along with the copper washer)
4. Disconnect:
   - Radiator outlet hose “2”



5. Drain:
   - Coolant (from the engine and radiator)
6. Remove:
   - Coolant reservoir “1”
   - Coolant reservoir cap “2”



7. Drain:
   - Coolant (from the coolant reservoir)
8. Install:
   - Coolant reservoir
9. Connect:
   - Radiator outlet hose
10. Install:
   - Coolant drain bolt (water pump) (along with the copper washer New)

Coolant drain bolt (water pump)
10 Nm (1.0 m·kg, 7.2 ft·lb)

11. Fill:
   - Cooling system (with the specified amount of the recommended coolant)

Recommended antifreeze
High-quality ethylene glycol antifreeze containing corrosion inhibitors for aluminum engines
Mixing ratio
1:1 (antifreeze:water)
Radiator capacity (including all routes)
2.60 L (2.75 US qt) (2.29 Imp.qt)
Coolant reservoir capacity (up to the maximum level mark)
0.25 L (0.26 US qt) (0.22 Imp.qt)

Handling notes for coolant
Coolant is potentially harmful and should be handled with special care.

EWA13040

WARNING

- **If coolant splashes in your eyes, thoroughly wash them with water and consult a doctor.**
- **If coolant splashes on your clothes, quickly wash it away with water and then with soap and water.**

• If coolant is swallowed, induce vomiting and get immediate medical attention.

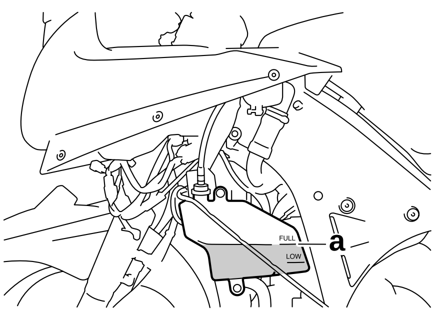
ECA13480

NOTICE

• Adding water instead of coolant lowers the antifreeze content of the coolant. If water is used instead of coolant check, and if necessary, correct the antifreeze concentration of the coolant.
• Use only distilled water. However, if distilled water is not available, soft water may be used.
• If coolant comes into contact with painted surfaces, immediately wash them with water.
• Do not mix different types of antifreeze.

12.Install:
- Radiator cap

13.Fill:
- Coolant reservoir
  (with the recommended coolant to the maximum level mark "a")



14.Install:
- Coolant reservoir cap

15.Start the engine, warm it up for several minutes, and then stop it.

16.Check:
- Coolant level
  Refer to "CHECKING THE COOLANT LEVEL" on page 3-24.

TIP

Before checking the coolant level, wait a few minutes until the coolant has settled.

17.Install:
- Front cowling assembly
  Refer to "GENERAL CHASSIS" on page 4-1.

EAS21140
CHASSIS

EAS21160
ADJUSTING THE FRONT DISC BRAKE

1. Adjust:
   - Brake lever position
     (distance "a" from the throttle grip to the brake lever)

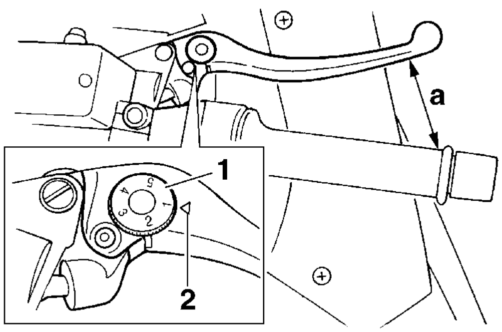
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a. While pushing the brake lever forward, turn the adjusting dial "1" until the brake lever is in the desired position.

TIP

Be sure to align the setting on the adjusting dial with the arrow mark "2" on the brake lever.

Position #1
Distance "a" is the largest.
Position #5
Distance "a" is the smallest.



EWA13050
WARNING

A soft or spongy feeling in the brake lever can indicate the presence of air in the brake system. Before the vehicle is operated, the air must be removed by bleeding the brake system. Air in the brake system will considerably reduce braking performance.

ECA13490
NOTICE

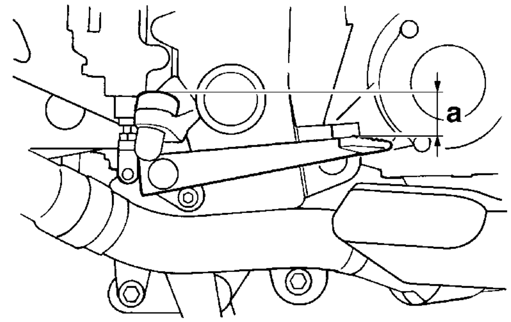
After adjusting the brake lever position, make sure there is no brake drag.

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EAS21190
ADJUSTING THE REAR DISC BRAKE

1. Check:
   - Brake pedal position
     (distance "a" from the top of the rider footrest to the top of the brake pedal)
     Out of specification → Adjust.

Brake pedal position
42.0 mm (1.65 in) (below the top of the rider footrest)



2. Adjust:
   - Brake pedal position

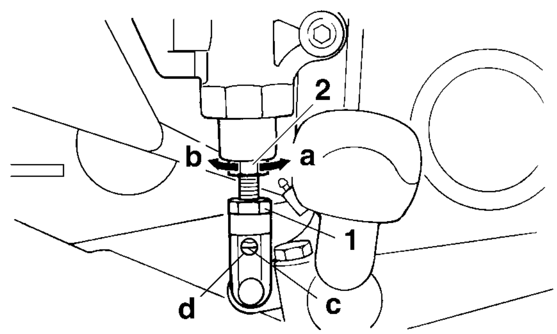
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a. Loosen the locknut "1".
b. Turn the adjusting bolt "2" in direction "a" or "b" until the specified brake pedal position is obtained.

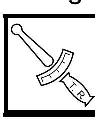
Direction "a"
Brake pedal is raised.
Direction "b"
Brake pedal is lowered.

EWA13070
WARNING

After adjusting the brake pedal position, check that the end of the adjusting bolt "c" is visible through the hole "d".



c. Tighten the locknut "1" to specification.



Locknut
16 Nm (1.6 m·kg, 11 ft·lb)

EW3P61002
WARNING

A soft or spongy feeling in the brake pedal can indicate the presence of air in the brake system. Before the vehicle is operated, the

air must be removed by bleeding the brake system. Air in the brake system will considerably reduce braking performance.

ECA13510

NOTICE

After adjusting the brake pedal position, make sure there is no brake drag.

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3. Adjust:
   - Rear brake light switch
     Refer to “ADJUSTING THE REAR BRAKE LIGHT SWITCH” on page 3-30.

EAS21240

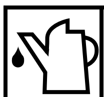
CHECKING THE BRAKE FLUID LEVEL

1. Stand the vehicle on a level surface.

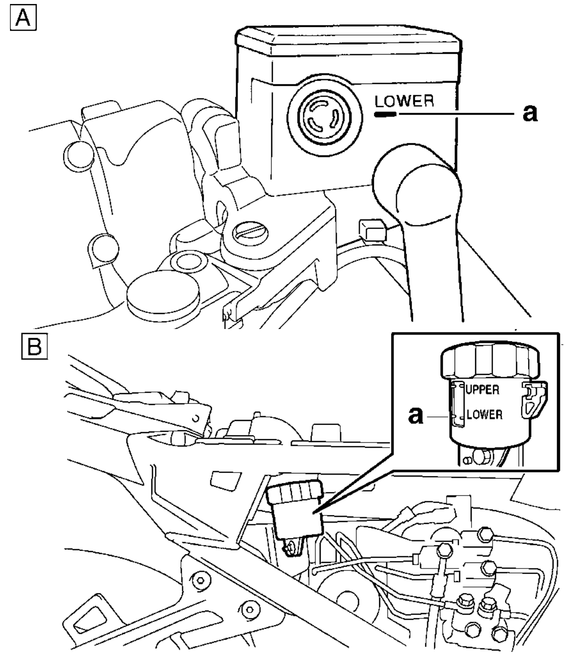
TIP

- Place the vehicle on the centerstand.
- Make sure the vehicle is upright.

2. Remove:
   - Right side cover
     Refer to “GENERAL CHASSIS” on page 4-1.
3. Check:
   - Brake fluid level
     Below the minimum level mark “a” → Add the recommended brake fluid to the proper level.



Front brake
Recommended fluid
DOT 4
Rear brake
Recommended fluid
DOT 4



A. Front brake
B. Rear brake

EWA13090

WARNING

- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.**
- **When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.**

ECA13540

NOTICE

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

TIP

In order to ensure a correct reading of the brake fluid level, make sure the top of the brake fluid reservoir is horizontal.

4. Install:
   - Right side cover
     Refer to “GENERAL CHASSIS” on page 4-1.

EAS21250

CHECKING THE FRONT BRAKE PADS

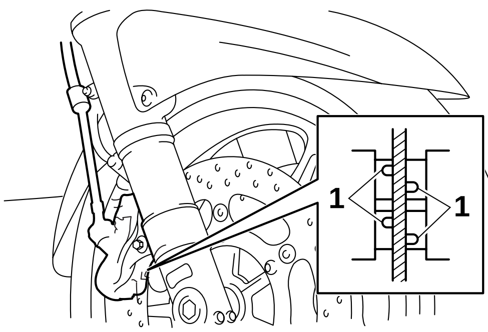
The following procedure applies to all of the brake pads.

EC3P61037

NOTICE

The amount of wear may differ for the brake pads of the right front brake caliper between the brake pads operated by the brake lever and the brake pads operated by the brake pedal. Each set of brake pads should be checked individually and replaced if necessary.

1. Operate the brake.
2. Check:
   - Front brake pad
     Wear indicator grooves “1” almost disappeared → Replace the brake pads as a set.
     Refer to “FRONT BRAKE” on page 4-32.

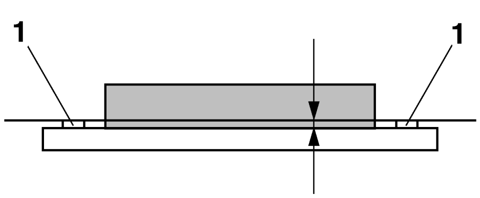


EAS21260

CHECKING THE REAR BRAKE PADS

The following procedure applies to all of the brake pads.

1. Operate the brake.
2. Check:
   - Rear brake pad
     Wear indicators “1” almost touch the brake disc → Replace the brake pads as a set.
     Refer to “REAR BRAKE” on page 4-44.



EAS21280

CHECKING THE BRAKE HOSES

The following procedure applies to all of the brake hoses and brake hose holders.

1. Check:
   - Brake hoses
     Cracks/damage/wear → Replace.
2. Check:
   - Brake hose holders
     Loose → Tighten the holder bolts.
3. Hold the vehicle upright and apply the brake several times.
4. Check:
   - Brake hoses
     Brake fluid leakage → Replace the damaged hose.
     Refer to “FRONT BRAKE” on page 4-32, “REAR BRAKE” on page 4-44 and “ABS (ANTI-LOCK BRAKE SYSTEM)” on page 4-57.

EAS21330

ADJUSTING THE REAR BRAKE LIGHT SWITCH

TIP

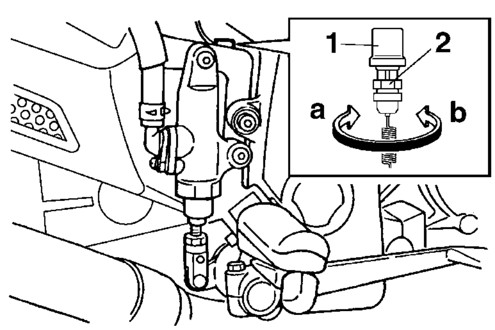
- The rear brake light switch is operated by movement of the brake pedal. The rear brake light switch is properly adjusted when the brake light comes on just before the braking effect starts.
- If the switch is not properly adjusted, ABS fault code No. 23 may be displayed.

1. Check:
   - Rear brake light operation timing
     Incorrect → Adjust.
2. Adjust:
   - Rear brake light operation timing

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a. Hold the main body “1” of the rear brake light switch so that it does not rotate and turn the adjusting nut “2” in direction “a” or “b” until the rear brake light comes on at the proper time.

Direction “a” **Brake light comes on sooner.** **Direction “b”** **Brake light comes on later.**



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EAS22780

BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)

EWA14000

WARNING

Always bleed the brake system when the brake related parts are removed.

EC3P61012

NOTICE

- **Bleed the brake system in the following order.**
- **1st step: Front brake calipers**
- **2nd step: Right front brake caliper (unified brake system)**
- **3rd step: Rear brake caliper**

EW3P61010

WARNING

Bleed the ABS whenever:
- **the system is disassembled.**
- **a brake hose is loosened, disconnected, or replaced.**
- **the brake fluid level is very low.**
- **brake operation is faulty.**

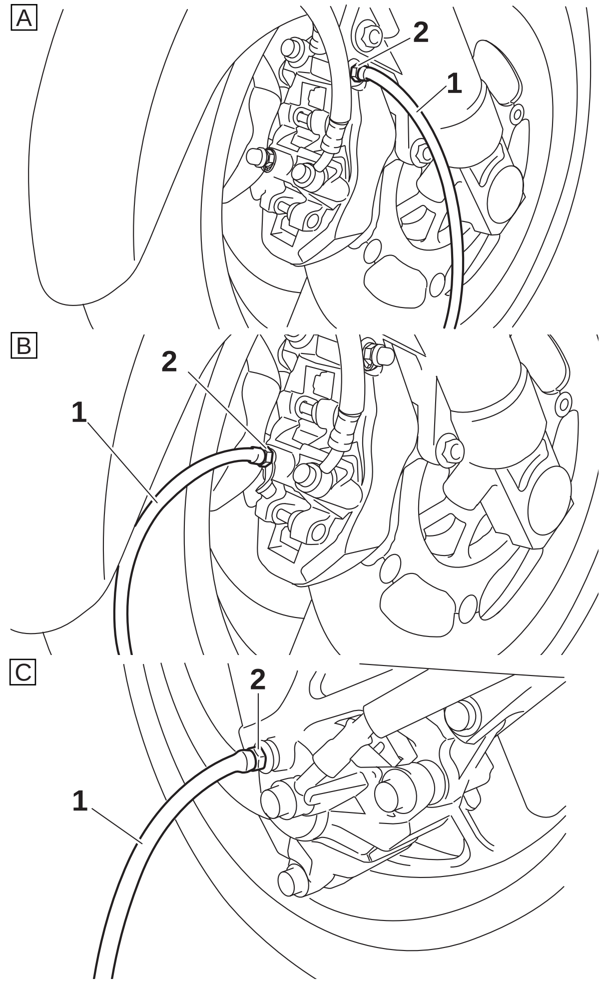
TIP

- Be careful not to spill any brake fluid or allow the brake master cylinder reservoir or brake fluid reservoir to overflow.
- When bleeding the ABS, make sure that there is always enough brake fluid before applying the brake. Ignoring this precaution could allow air to enter the ABS, considerably lengthening the bleeding procedure.
- If bleeding is difficult, it may be necessary to let the brake fluid settle for a few hours.
- Repeat the bleeding procedure when the tiny bubbles in the hose have disappeared.

1. Remove:
   - Right side cover
   Refer to “GENERAL CHASSIS” on page 4-1.
2. Bleed:
   - ABS

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a. Fill the brake master cylinder reservoir or brake fluid reservoir to the proper level with the recommended brake fluid.
b. Install the diaphragm (brake master cylinder reservoir or brake fluid reservoir).
c. Connect a clear plastic hose “1” tightly to the bleed screw “2”.



A. Front brake caliper
B. Right front brake caliper (unified brake system)
C. Rear brake caliper

d. Place the other end of the hose into a container.
e. Slowly apply the brake several times.
f. Fully squeeze the brake lever or fully depress the brake pedal and hold it in position.
g. Loosen the bleed screw.

TIP

Loosening the bleed screw will release the pressure and cause the brake lever to contact the throttle grip or the brake pedal to fully extend.

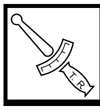
h. Tighten the bleed screw, and then release the brake lever or brake pedal.
i. Repeat steps (e) to (h) until all of the air bubbles have disappeared from the brake fluid in the plastic hose.
j. Check the operation of the hydraulic unit. Refer to “HYDRAULIC UNIT OPERATION TESTS” on page 4-66.

EC3P61029

NOTICE

Make sure that the main switch is turned to "OFF" before checking the operation of the hydraulic unit.

k. After operating the ABS, repeat steps (e) to (i), and then fill the brake master cylinder reservoir or brake fluid reservoir to the proper level with the recommended brake fluid.
l. Tighten the bleed screw to the specified torque.



	Brake caliper bleed screw **6 Nm (0.6 m·kg, 4.3 ft·lb)**

m. Fill the brake master cylinder reservoir or brake fluid reservoir to the proper level with the recommended brake fluid.
Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-29.

EWA14020

WARNING

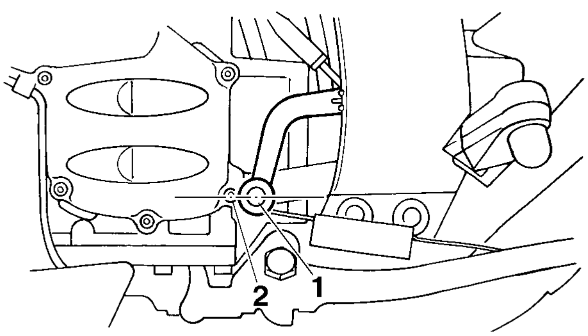
After bleeding the ABS, check the brake operation.

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EAS21380

ADJUSTING THE SHIFT PEDAL (FJR13A)

1. Check:
   • Shift pedal position
   Check that the center of the shift pedal end "1" is aligned with the center of the middle gear case cover bolt "2" as shown in the illustration when viewed directly from the side.
   Incorrect → Adjust.



2. Adjust:
   • Shift pedal position

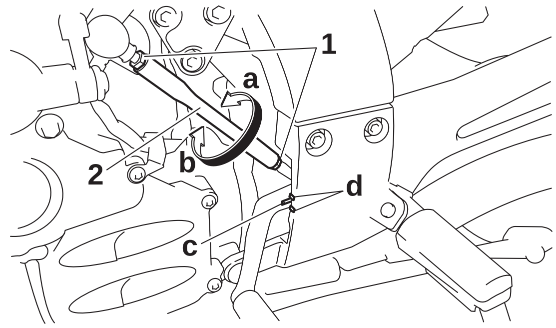
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a. Loosen both locknuts "1".
b. Turn the shift rod "2" in direction "a" or "b" to obtain the correct shift pedal position.

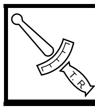
Direction "a"
Shift pedal is raised.
Direction "b"
Shift pedal is lowered.

TIP

Check that the groove "c" in the shift pedal is between the projections "d" on the frame.



c. Tighten both locknuts to specification.



	Locknut **7 Nm (0.7 m·kg, 5.1 ft·lb)**

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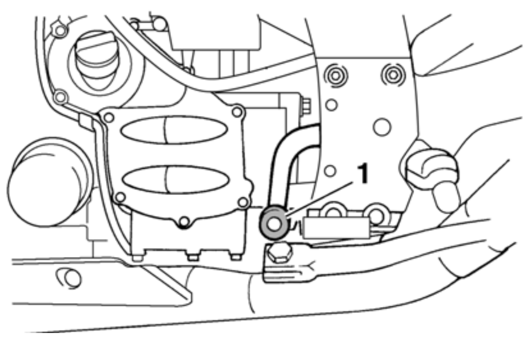
ET3P66029

ADJUSTING THE SHIFT PEDAL (FJR13AE)

1. Check:
   • Shift pedal position

TIP

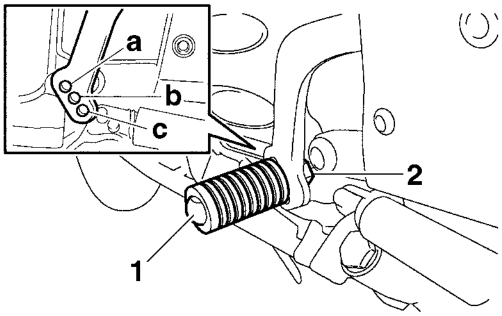
The shift pedal "1" can be adjusted to three positions to suit the rider's preference as shown.



2. Adjust:
   • Shift pedal position

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a. Remove the shift pedal "1" by removing the shift pedal bolt "2".



a. High position
b. Standard position
c. Low position

b. Move the shift pedal to the desired position.
c. Install the shift pedal bolt, and then tighten it to specification.

Shift pedal bolt
7 Nm (0.7 m·kg, 5.1 ft·lb)
LOCTITE®

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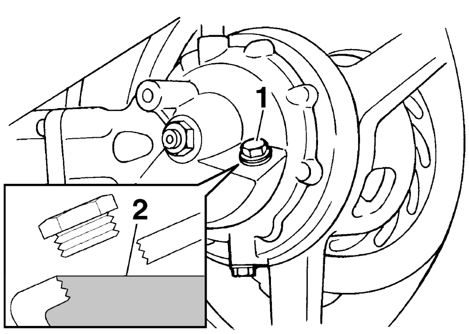
EAS21460
CHECKING THE FINAL GEAR OIL LEVEL

1. Stand the vehicle on a level surface.

TIP

- Place the vehicle on the centerstand.
- Make sure the vehicle is upright.

2. Remove:
   - Final gear oil filler bolt "1"
3. Check:
   - Final gear oil level
     The final gear oil level should be to the bottom brim "2" of the filler hole.
     Below the bottom brim → Add the recommended final gear oil to the proper level.



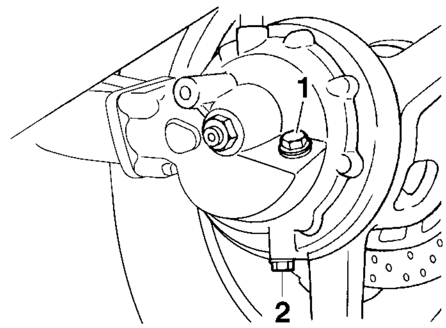
Type
Shaft drive gear oil (Part No.: 9079E-SH001-00)

4. Install:
   - Final gear oil filler bolt

Final gear oil filler bolt
23 Nm (2.3 m·kg, 17 ft·lb)

EAS21470
CHANGING THE FINAL GEAR OIL

1. Place a container under the final gear case.
2. Remove:
   - Final gear oil filler bolt "1"
   - Final gear oil drain bolt "2"
     Completely drain the final gear case of its oil.



3. Check:
   - Final gear oil drain bolt gasket
     Damage → Replace.
4. Install:
   - Final gear oil drain bolt
     (along with the gasket New)

Final gear oil drain bolt
23 Nm (2.3 m·kg, 17 ft·lb)

5. Fill:
   - Final gear case
     (with the specified amount of the recommended final gear oil)

Quantity
0.20 L (0.21 US qt) (0.18 Imp.qt)

Refer to "CHECKING THE FINAL GEAR OIL LEVEL" on page 3-33.

EAS21510
CHECKING AND ADJUSTING THE STEERING HEAD

1. Stand the vehicle on a level surface.

EWA13120
WARNING

Securely support the vehicle so that there is no danger of it falling over.

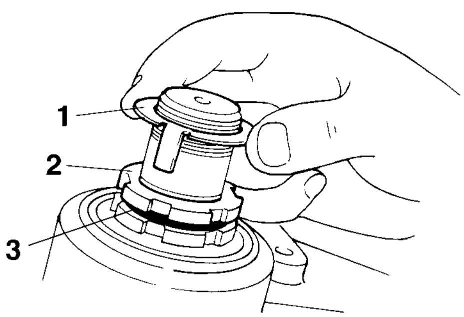
TIP

Place the vehicle on a suitable stand so that the front wheel is elevated.

2. Check:
   - Steering head
     Grasp the bottom of the front fork legs and gently rock the front fork.
     Binding/looseness → Adjust the steering head.
3. Remove:
   - Upper bracket
     Refer to “STEERING HEAD” on page 4-89.
4. Adjust:
   - Steering head

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a. Remove the lock washer “1”, the upper ring nut “2”, and the rubber washer “3”.



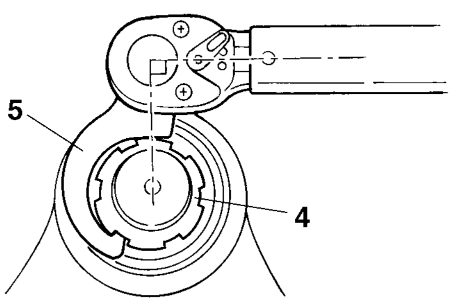
b. Tighten the lower ring nut “4” with a steering nut wrench “5”.

	Steering nut wrench **90890-01403** **Exhaust flange nut wrench** **YU-A9472**

	Lower ring nut (initial tightening torque) **52 Nm (5.2 m·kg, 37 ft·lb)**

TIP

Set a torque wrench at a right angle to the steering nut wrench.



c. Loosen the lower ring nut completely and then tighten it to specification with a steering nut wrench.

EWA13140

⚠ WARNING

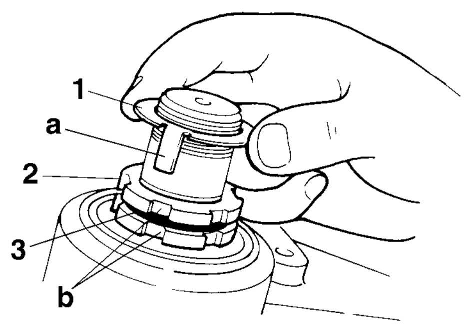
Do not overtighten the lower ring nut.

	Lower ring nut (final tightening torque) **18 Nm (1.8 m·kg, 13 ft·lb)**

d. Check the steering head for looseness or binding by turning the front fork all the way in both directions. If any binding is felt, remove the lower bracket and check the upper and lower bearings.
   Refer to “STEERING HEAD” on page 4-89.
e. Install the rubber washer “3”.
f. Install the upper ring nut “2”.
g. Finger tighten the upper ring nut, then align the slots of both ring nuts. If necessary, hold the lower ring nut and tighten the upper ring nut until their slots are aligned.
h. Install the lock washer “1”.

TIP

Make sure the lock washer tabs “a” sit correctly in the ring nut slots “b”.



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5. Install:
   - Upper bracket
     Refer to “STEERING HEAD” on page 4-89.

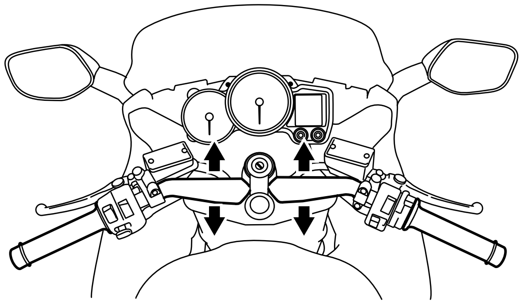
ET3P61034

ADJUSTING THE HANDLEBAR POSITION

1. Check:
   - Handlebar position

TIP

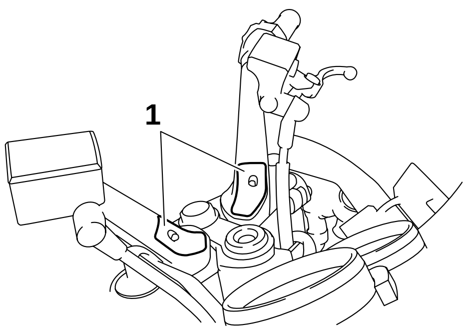
The handlebar position can be adjusted to one of three positions to suit the rider’s preference.



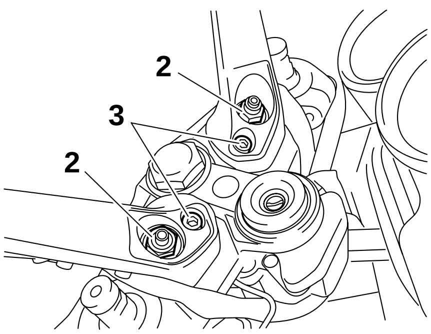
2. Adjust:
   • Handlebar position

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a. Remove the plates “1”.



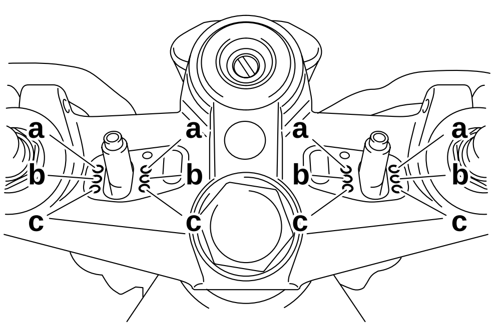
b. Remove the handlebar nuts “2” and bolts “3”.



c. Remove the handlebars.
d. Install the handlebars in the desired position.

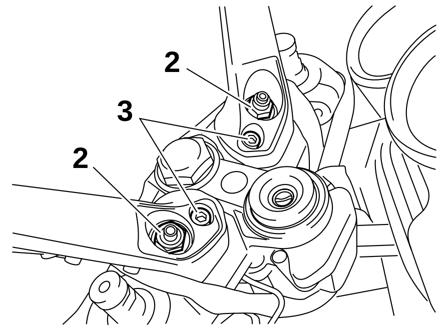
TIP

Fit the projections on each handlebar into the holes in the upper bracket, making sure that the handlebars are installed in the same position.



a. Front position
b. Standard position
c. Rear position

e. Install the handlebar bolts “3” and nuts “2” temporarily.



f. Tighten the handlebar bolts and nuts.

Handlebar bolt
23 Nm (2.3 m·kg, 17 ft·lb)
Handlebar nut
65 Nm (6.5 m·kg, 47 ft·lb)

TIP

First tighten the bolts, then tighten the nuts.

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EAS21530

CHECKING THE FRONT FORK

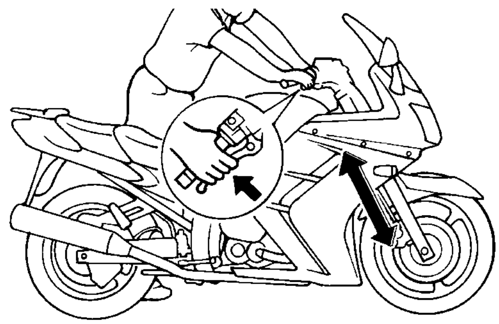
1. Stand the vehicle on a level surface.

EWA13120

⚠ WARNING

Securely support the vehicle so that there is no danger of it falling over.

2. Check:
   • Inner tube
     Damage/scratches → Replace.
   • Oil seal
     Oil leakage → Replace.
3. Hold the vehicle upright and apply the front brake.
4. Check:
   • Front fork operation
     Push down hard on the handlebar several times and check if the front fork rebounds smoothly.
     Rough movement → Repair.
     Refer to “FRONT FORK” on page 4-79.



EAS21580

ADJUSTING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

EWA13150

WARNING

- **Always adjust both front fork legs evenly. Uneven adjustment can result in poor handling and loss of stability.**
- **Securely support the motorcycle so that there is no danger of it falling over.**

Spring preload

ECA13570

NOTICE

- **Grooves are provided to indicate the adjustment position.**
- **Never go beyond the maximum or minimum adjustment positions.**

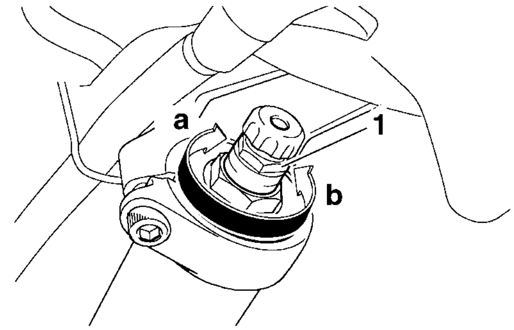
1. Adjust:
   - Spring preload

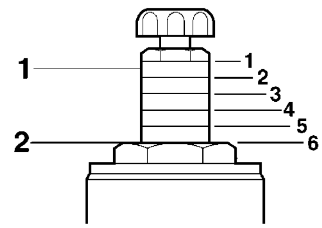
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a. Turn the adjusting bolt “1” in direction “a” or “b”.

Direction “a”
Spring preload is increased (suspension is harder).
Direction “b”
Spring preload is decreased (suspension is softer).

Spring preload adjusting positions
Minimum
6
Standard
4
Maximum
1





2. Current setting

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

Rebound damping

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

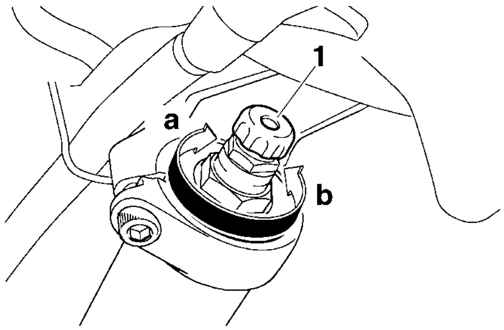
1. Adjust:
   - Rebound damping

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a. Turn the adjusting knob “1” in direction “a” or “b”.

Direction “a”
Rebound damping is increased (suspension is harder).
Direction “b”
Rebound damping is decreased (suspension is softer).

Rebound damping adjusting positions
Minimum
17 click(s) out*
Standard
12 click(s) out*
Maximum
1 click(s) out*
*** With the adjusting knob fully turned in**



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Compression damping

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

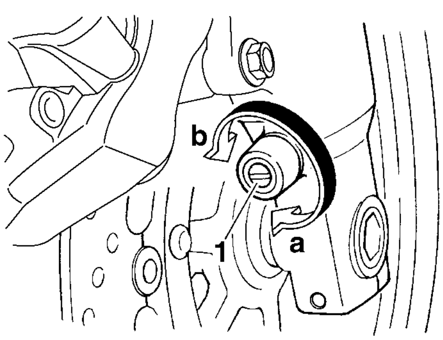
1. Adjust:
   - Compression damping

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a. Turn the adjusting screw “1” in direction “a” or “b”.

Direction “a”
Compression damping is increased (suspension is harder).
Direction “b”
Compression damping is decreased (suspension is softer).

Compression damping adjusting positions
Minimum
21 click(s) out*
Standard
12 click(s) out*
Maximum
1 click(s) out*
*** With the adjusting screw fully turned in**



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EAS21600

ADJUSTING THE REAR SHOCK ABSORBER ASSEMBLY

EWA13120

WARNING

Securely support the vehicle so that there is no danger of it falling over.

Spring preload

ECA13590

NOTICE

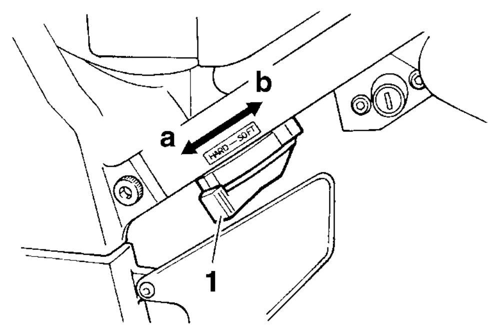
Never go beyond the maximum or minimum adjustment positions.

1. Adjust:
   - Spring preload

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a. Move the adjusting lever “1” in direction “a” or “b”.
b. Adjust the adjusting lever to “HARD” or “SOFT”.

Direction “a”
Spring preload is increased (suspension is harder).
Direction “b”
Spring preload is decreased (suspension is softer).



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Rebound damping

ECA13590

NOTICE

Never go beyond the maximum or minimum adjustment positions.

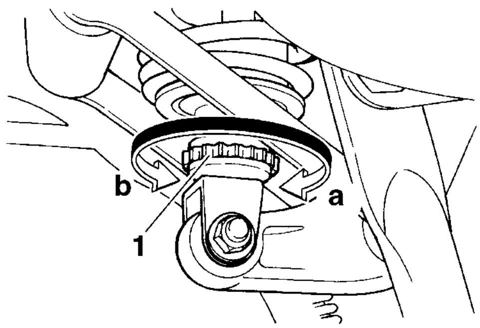
1. Adjust:
   - Rebound damping

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a. Turn the adjusting knob “1” in direction “a” or “b”.

Direction "a"
Rebound damping is increased (suspension is harder).
Direction "b"
Rebound damping is decreased (suspension is softer).

Rebound damping adjusting positions
Minimum
20 click(s) out*
Standard
12 click(s) out*
Maximum
3 click(s) out*
*** With the adjusting knob fully turned in**



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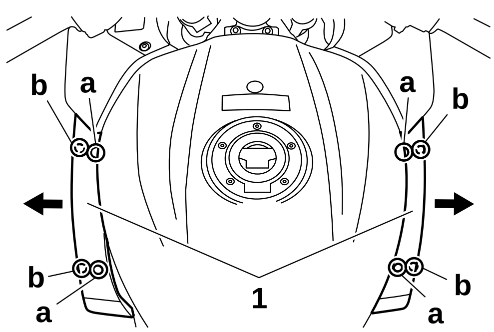
ET3P61035

ADJUSTING THE SIDE PANELS

1. Adjust:
   - Side panel position

TIP

The side panels "1" can be tilted back 30 mm (1.18 in) for added ventilation to suit the riding conditions.

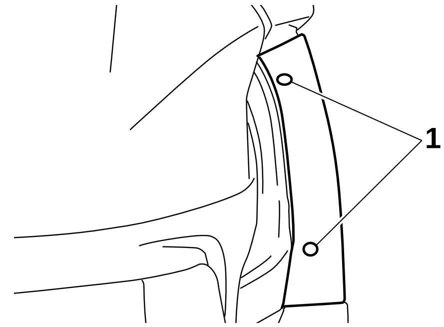


a. Closed position
b. Open position

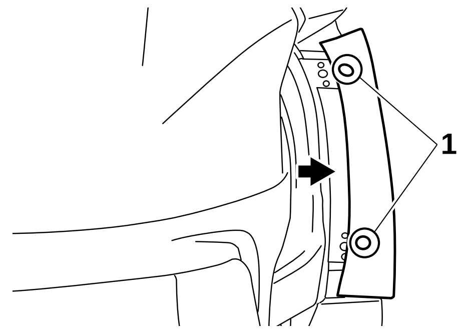
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To open a side panel

a. Remove the quick fastener screws "1".



b. Pull the side panel to the open position, and then install the quick fastener screws "1".

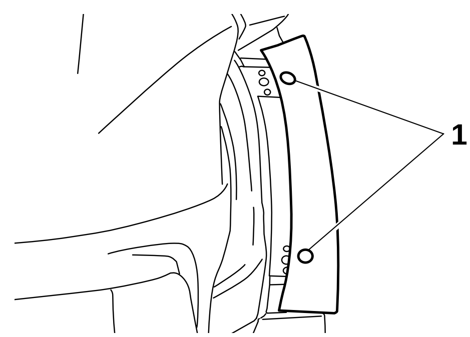


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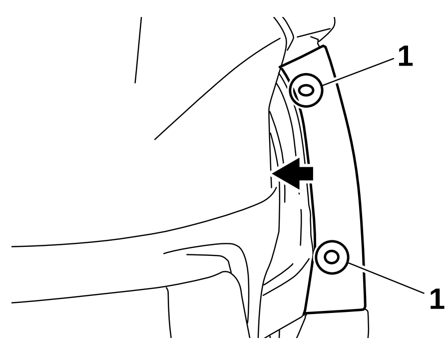
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To close a side panel

a. Remove the quick fastener screws "1".



b. Push the side panel to the closed position, and then install the quick fastener screws "1".



TIP

Make sure that the side panel is properly installed.

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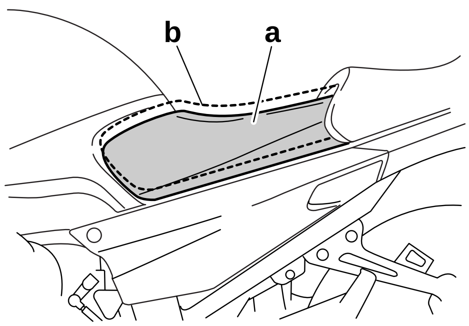
ET3P61036

ADJUSTING THE RIDER SEAT HEIGHT

1. Check:
   - Rider seat height

TIP

- The rider seat height can be adjusted to one of two positions to suit the rider's preference.
- The rider seat height was adjusted to the lower position at delivery.

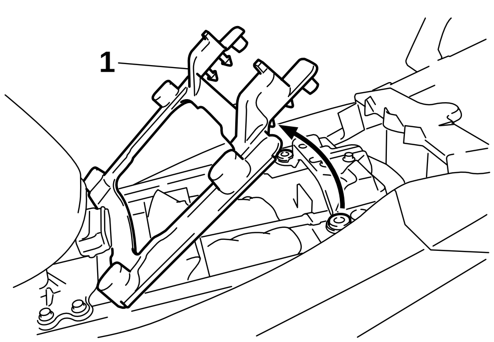


a. Low position
b. High position

2. Remove:
   - Passenger seat
   - Rider seat
   Refer to "GENERAL CHASSIS" on page 4-1.
3. Remove:
   - Rider seat height position adjuster "1"

TIP

Remove the rider seat height position adjuster by pulling it upward.

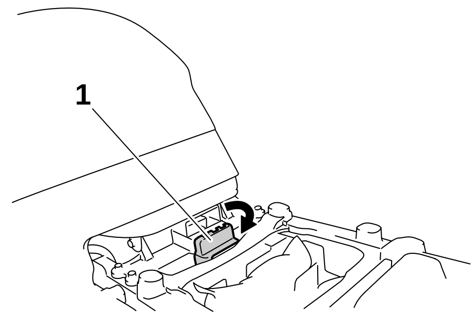


4. Adjust:
   - Rider seat height

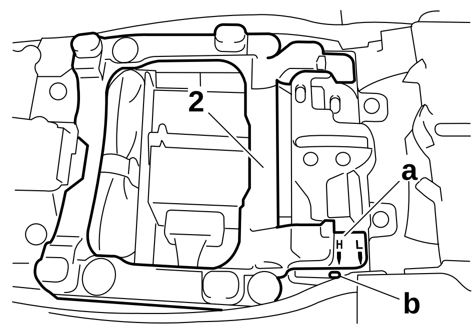
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To change to the high position

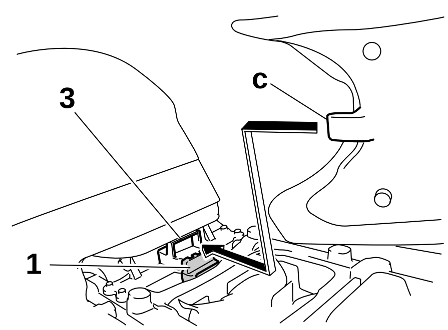
a. Move the rider seat holder cover "1" to the lower position as shown.



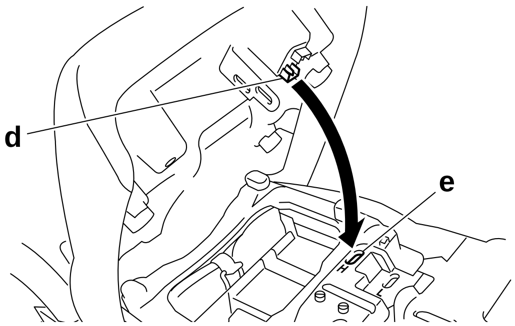
b. Install the rider seat height position adjuster "2" so that the "H" mark "a" is aligned with the match mark "b".



c. Insert the projection "c" on the front of the rider seat into seat holder (for high position) "3" as shown.

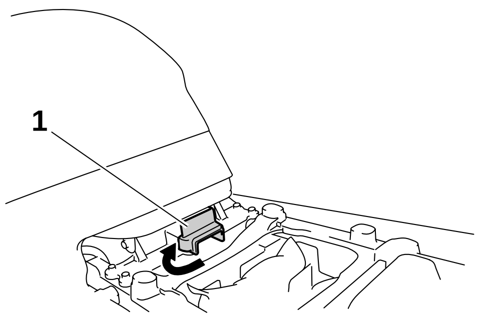


d. Align the high position projection "d" on the bottom of the rider seat with the "H" position slot "e", and then push the rear of the seat down to lock it in place as shown.

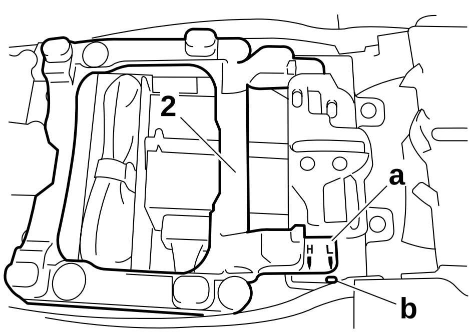


To change to the low position

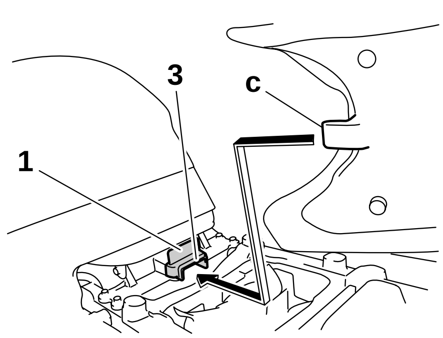
a. Move the rider seat holder cover “1” to the upper position as shown.



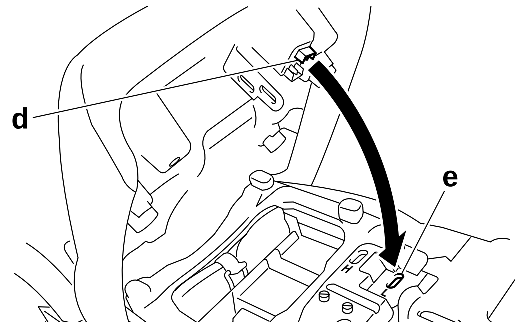
b. Install the rider seat height position adjuster “2” so that the “L” mark “a” is aligned with the match mark “b”.



c. Insert the projection “c” on the front of the rider seat into seat holder (for low position) “3” as shown.



d. Align the low position projection “d” on the bottom of the rider seat with the “L” position slot “e”, and then push the rear of the seat down to lock it in place as shown.



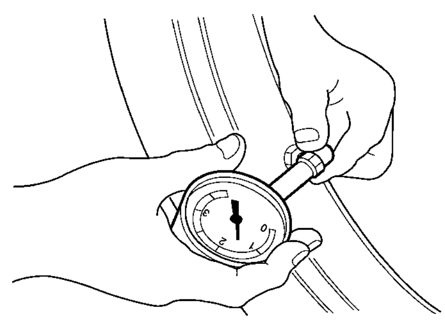
5. Install:
   - Passenger seat
     Refer to “GENERAL CHASSIS” on page 4-1.

EAS21650

CHECKING THE TIRES

The following procedure applies to both of the tires.

1. Check:
   - Tire pressure
     Out of specification → Regulate.



EWA13180

WARNING

- **The tire pressure should only be checked and regulated when the tire temperature equals the ambient air temperature.**
- **The tire pressure and the suspension must be adjusted according to the total weight (including cargo, rider, passenger and accessories) and the anticipated riding speed.**
- **Operation of an overloaded vehicle could cause tire damage, an accident or an injury.**

NEVER OVERLOAD THE VEHICLE.

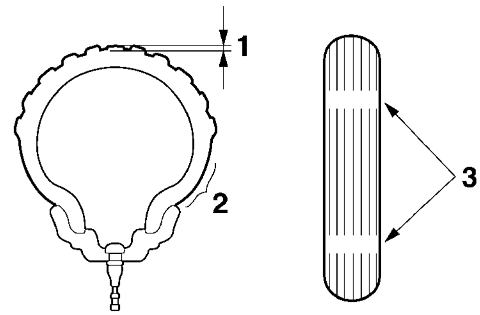
Tire air pressure (measured on cold tires)
Loading condition
0–90 kg (0–198 lb)
Front
270 kPa (39 psi) (2.70 kgf/cm²)
Rear
290 kPa (42 psi) (2.90 kgf/cm²)
Loading condition
FJR13A 90–212 kg (198–467 lb) (USA)
FJR13A 90–211 kg (198–465 lb) (California)
FJR13AE 90–208 kg (198–459 lb) (USA)
FJR13AE 90–207 kg (198–456 lb) (California)
Front
270 kPa (39 psi) (2.70 kgf/cm²)
Rear
290 kPa (42 psi) (2.90 kgf/cm²)
High-speed riding
Front
270 kPa (39 psi) (2.70 kgf/cm²)
Rear
290 kPa (42 psi) (2.90 kgf/cm²)
Maximum load
FJR13A 212 kg (467 lb) (USA)
FJR13A 211 kg (465 lb) (California)
FJR13AE 208 kg (459 lb) (USA)
FJR13AE 207 kg (456 lb) (California)
*** Total weight of rider, passenger, cargo and accessories**

EWA13190

WARNING

It is dangerous to ride with a worn-out tire. When the tire tread reaches the wear limit, replace the tire immediately.

2. Check:
   - Tire surfaces
     Damage/wear → Replace the tire.



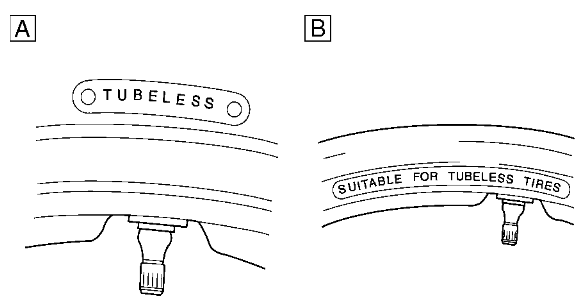
1. Tire tread depth
2. Side wall
3. Wear indicator

Wear limit (front)
1.0 mm (0.04 in)
Wear limit (rear)
1.0 mm (0.04 in)

EWA14080

WARNING

- **Do not use a tubeless tire on a wheel designed only for tube tires to avoid tire failure and personal injury from sudden deflation.**
- **When using a tube tire, be sure to install the correct tube.**
- **Always replace a new tube tire and a new tube as a set.**
- **To avoid pinching the tube, make sure the wheel rim band and tube are centered in the wheel groove.**
- **Patching a punctured tube is not recommended. If it is absolutely necessary to do so, use great care and replace the tube as soon as possible with a good quality replacement.**



A. Tire
B. Wheel

Tube wheel	Tube tire only
Tubeless wheel	Tube or tubeless tire

EWA14090

⚠ WARNING

After extensive tests, the tires listed below have been approved by Yamaha Motor Co., Ltd. for this model. The front and rear tires should always be by the same manufacturer and of the same design. No guarantee concerning handling characteristics can be given if a tire combination other than one approved by Yamaha is used on this vehicle.

Front tire
Size
120/70 ZR17M/C (58W)
Manufacturer/model
METZELER/Roadtec Z6G
Manufacturer/model
BRIDGESTONE/BT021F F

Rear tire
Size
180/55 ZR17M/C (73W)
Manufacturer/model
METZELER/Roadtec Z6C
Manufacturer/model
BRIDGESTONE/BT021R F

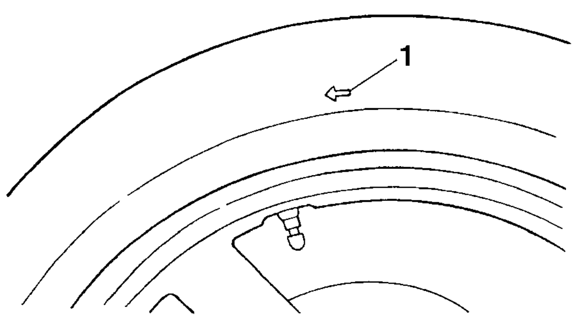
EWA13210

⚠ WARNING

New tires have a relatively low grip on the road surface until they have been slightly worn. Therefore, approximately 100 km should be traveled at normal speed before any high-speed riding is done.

TIP

For tires with a direction of rotation mark “1”:
Install the tire with the mark pointing in the direction of wheel rotation.



EAS21670

CHECKING THE WHEELS

The following procedure applies to both of the wheels.

1. Check:
   - Wheel
     Damage/out-of-round → Replace.

EWA13260

⚠ WARNING

Never attempt to make any repairs to the wheel.

TIP

After a tire or wheel has been changed or replaced, always balance the wheel.

EAS21690

CHECKING AND LUBRICATING THE CABLES

The following procedure applies to all of the inner and outer cables.

EWA13270

⚠ WARNING

Damaged outer cable may cause the cable to corrode and interfere with its movement. Replace damaged outer cable and inner cables as soon as possible.

1. Check:
   - Outer cable
     Damage → Replace.
2. Check:
   - Cable operation
     Rough movement → Lubricate.

Recommended lubricant
Engine oil or a suitable cable lubricant

TIP

Hold the cable end upright and pour a few drops of lubricant into the cable sheath or use a suitable lubricating device.

EAS21700

LUBRICATING THE LEVERS

Lubricate the pivoting point and metal-to-metal moving parts of the levers.

Recommended lubricant
Silicone grease

EAS21710

LUBRICATING THE PEDALS

Lubricate the pivoting point and metal-to-metal moving parts of the pedals.

Recommended lubricant
Lithium-soap-based grease

EAS21720

LUBRICATING THE SIDESTAND

Lubricate the pivoting point and metal-to-metal moving parts of the sidestand.

	Recommended lubricant **Lithium-soap-based grease**

EAS21730

LUBRICATING THE CENTERSTAND

Lubricate the pivoting point and metal-to-metal moving parts of the centerstand.

	Recommended lubricant **Lithium-soap-based grease**

EAS21740

LUBRICATING THE REAR SUSPENSION

Lubricate the pivoting point and metal-to-metal moving parts of the rear suspension.

	Recommended lubricant **Lithium-soap-based grease**

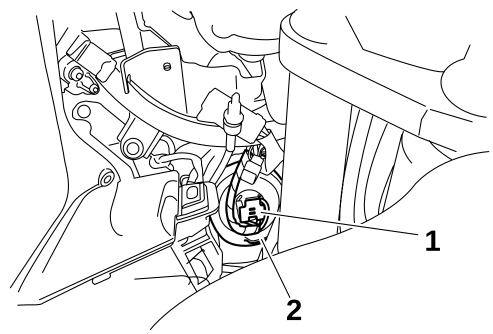
EAS21750
ELECTRICAL SYSTEM

EAS21760
CHECKING AND CHARGING THE BATTERY
Refer to "ELECTRICAL COMPONENTS" on page 8-213.

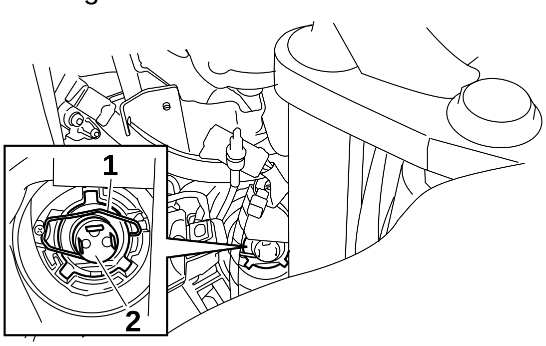
EAS21770
CHECKING THE FUSES
Refer to "ELECTRICAL COMPONENTS" on page 8-213.

EAS21790
REPLACING THE HEADLIGHT BULBS
The following procedure applies to both of the headlight bulbs.

1. Remove:
   - Front cowling left inner panel 1
   - Front cowling left inner panel 2
   - Front cowling right inner panel 1
   - Front cowling right inner panel 2
     Refer to "GENERAL CHASSIS" on page 4-1.
2. Disconnect:
   - Headlight coupler "1"
3. Remove:
   - Headlight bulb cover "2"



4. Detach:
   - Headlight bulb holder "1"
5. Remove:
   - Headlight bulb "2"



EWA13320
WARNING

Since the headlight bulb gets extremely hot, keep flammable products and your hands away from the bulb until it has cooled down.

6. Install:
   - Headlight bulb New
     Secure the new headlight bulb with the headlight bulb holder.

ECA13690
NOTICE

Avoid touching the glass part of the headlight bulb to keep it free from oil, otherwise the transparency of the glass, the life of the bulb and the luminous flux will be adversely affected. If the headlight bulb gets soiled, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.

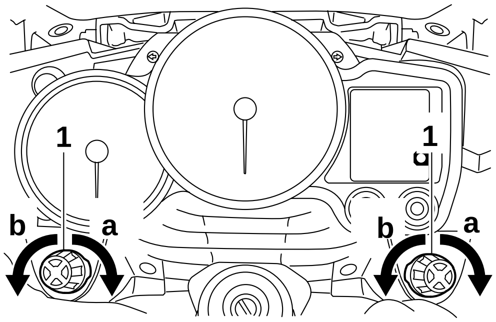
7. Attach:
   - Headlight bulb holder
8. Install:
   - Headlight bulb cover
9. Connect:
   - Headlight coupler
10. Install:
   - Front cowling right inner panel 2
   - Front cowling right inner panel 1
   - Front cowling left inner panel 2
   - Front cowling left inner panel 1
     Refer to "GENERAL CHASSIS" on page 4-1.

EAS21810
ADJUSTING THE HEADLIGHT BEAMS
1. Adjust:
   - Headlight beam (vertically)

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a. Turn the adjusting knobs "1" in direction "a" or "b".

Direction "a"
Headlight beam is raised.
Direction "b"
Headlight beam is lowered.



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2. Adjust:
   - Headlight beam (horizontally)

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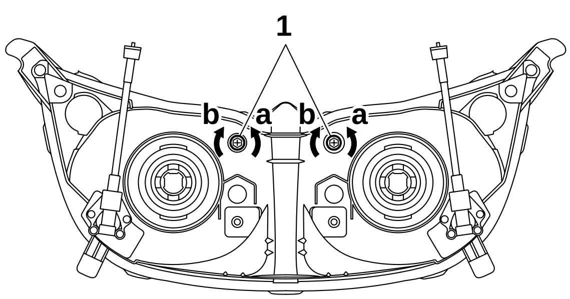
a. Turn the adjusting screws “1” in direction “a” or “b”.

   Left headlight

Direction “a” **Headlight beam moves to the left.** **Direction “b”** **Headlight beam moves to the right.**

   Right headlight

Direction “a” **Headlight beam moves to the right.** **Direction “b”** **Headlight beam moves to the left.**

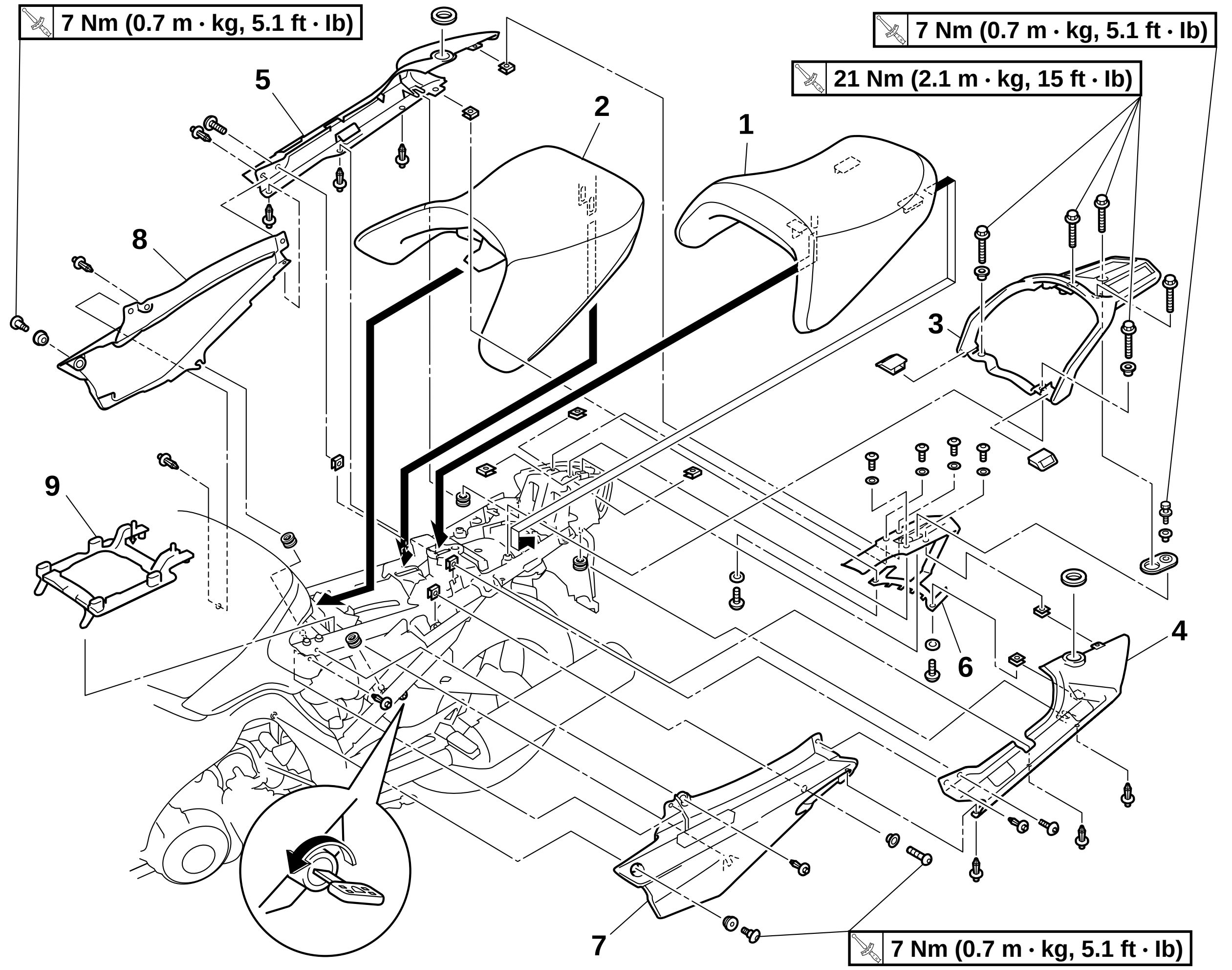


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CHASSIS

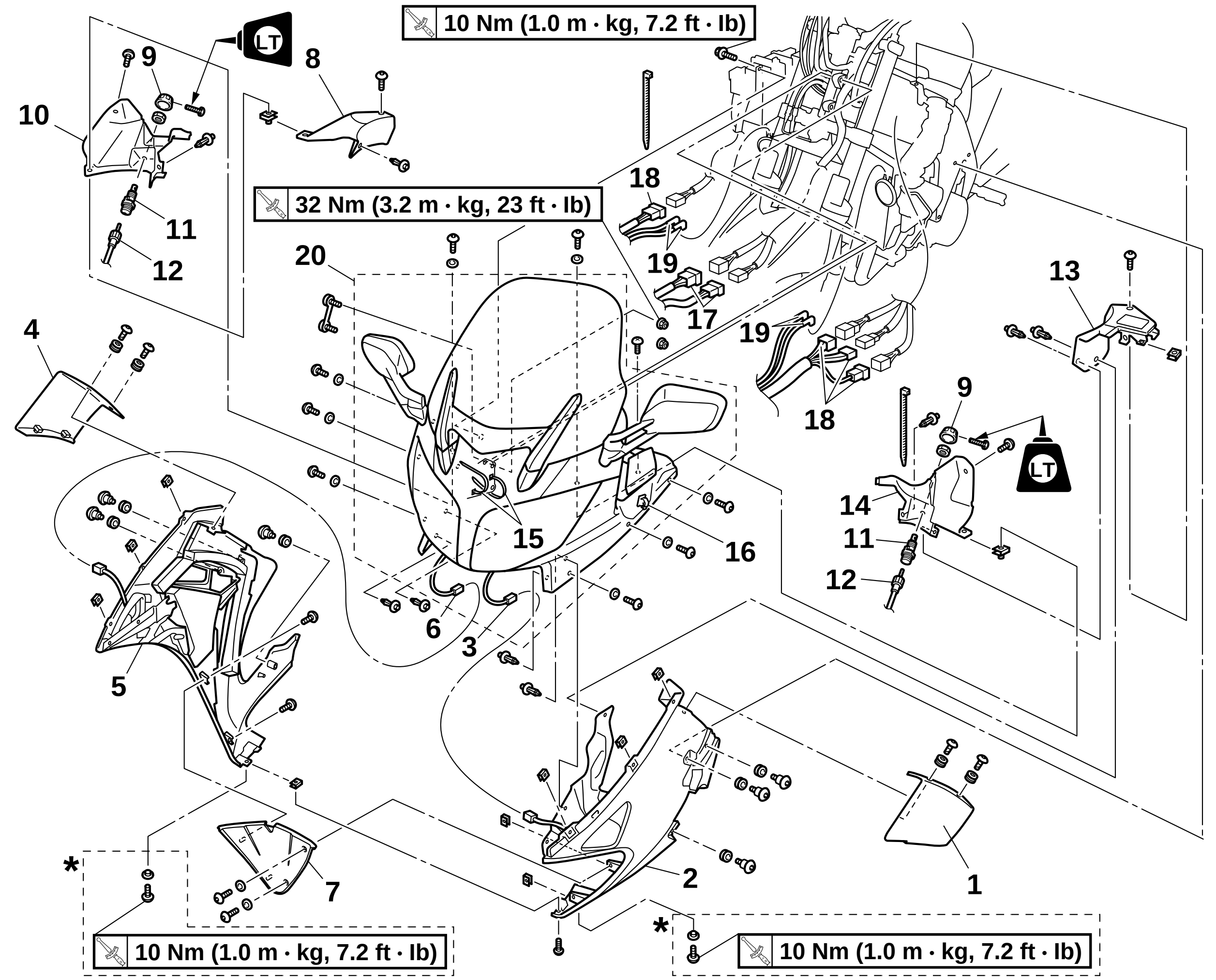
EAS21830
GENERAL CHASSIS

Removing the seats and covers



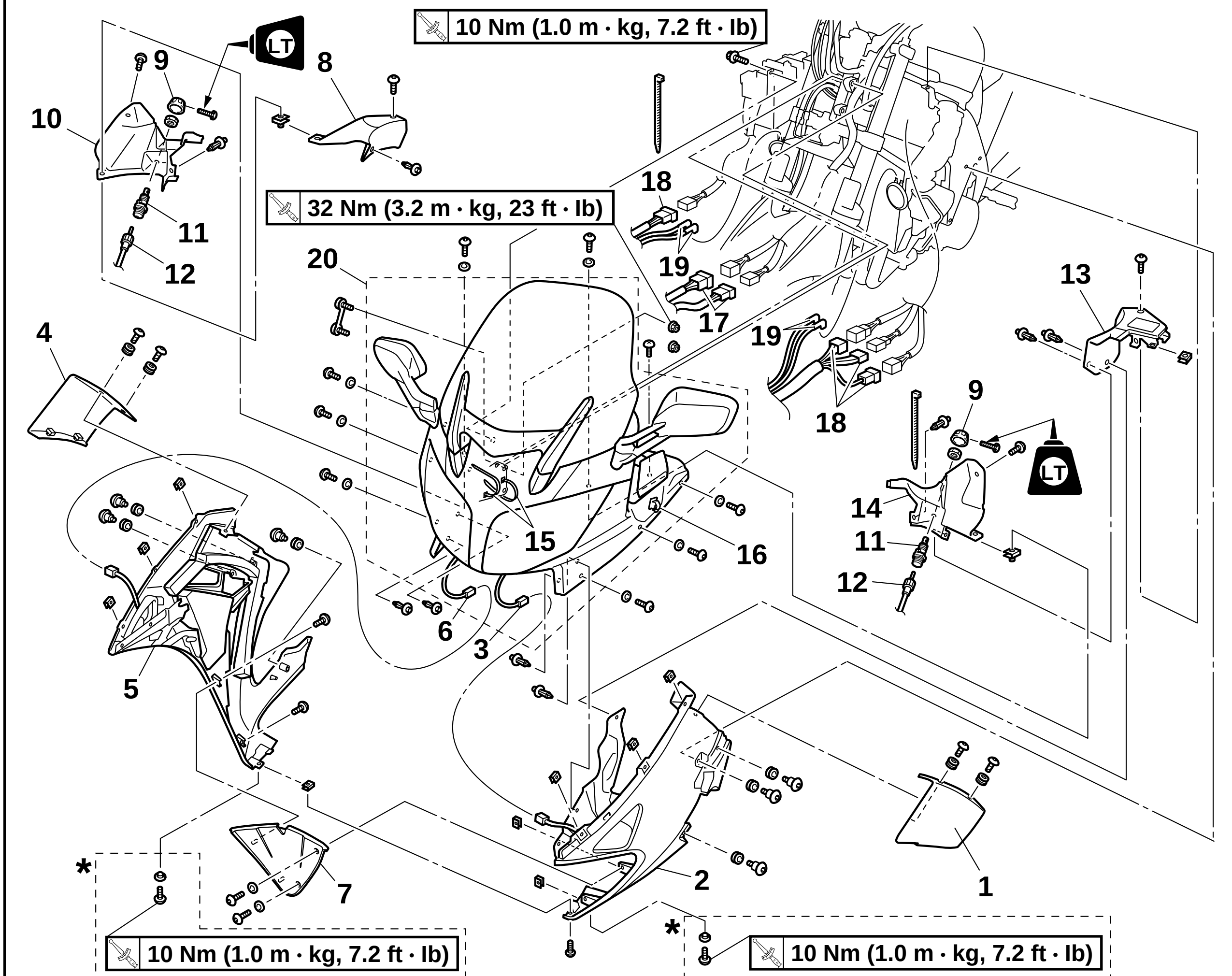
Order	Job/Parts to remove	Q'ty	Remarks
1	Passenger seat	1	
2	Rider seat	1	
3	Grab bar	1	
4	Left rear cowling	1	
5	Right rear cowling	1	
6	Center rear cowling	1	
7	Left side cover	1	
8	Right side cover	1	
9	Rider seat height position adjuster	1	
			For installation, reverse the removal procedure.

Removing the front cowling assembly (FJR13A)



Order	Job/Parts to remove	Q'ty	Remarks
	Open the accessory box lid.		
1	Left side panel	1	
2	Left side cowling	1	
3	Front left turn signal/position light coupler	1	Disconnect.
4	Right side panel	1	
5	Right side cowling	1	
6	Front right turn signal/position light coupler	1	Disconnect.
7	Bottom cowling	1	
8	Front cowling right inner panel 1	1	
9	Headlight beam adjusting knob	2	
10	Front cowling right inner panel 2	1	
11	Adjusting knob shaft	2	
12	Headlight beam adjusting cable	2	Disconnect.
13	Front cowling left inner panel 1	1	
14	Front cowling left inner panel 2	1	
15	Plastic band	2	Disconnect.
16	Plastic holder	1	Disconnect.

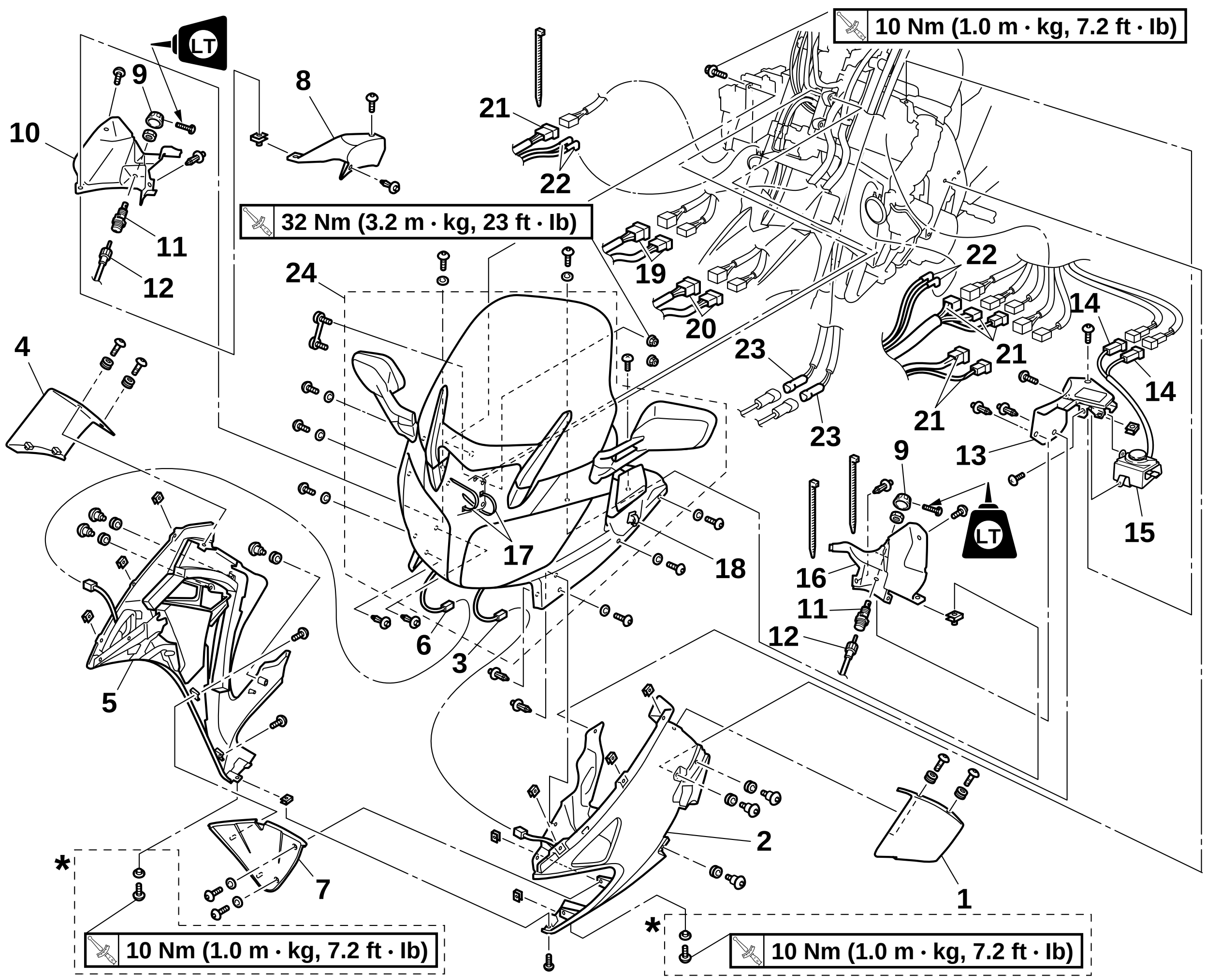
Removing the front cowling assembly (FJR13A)



Order	Job/Parts to remove	Q'ty	Remarks
17	Handlebar switch coupler	2	Disconnect.
18	Front cowling wire harness coupler	4	Disconnect.
19	Horn connector	4	Disconnect.
20	Front cowling assembly	1	
			For installation, reverse the removal procedure.

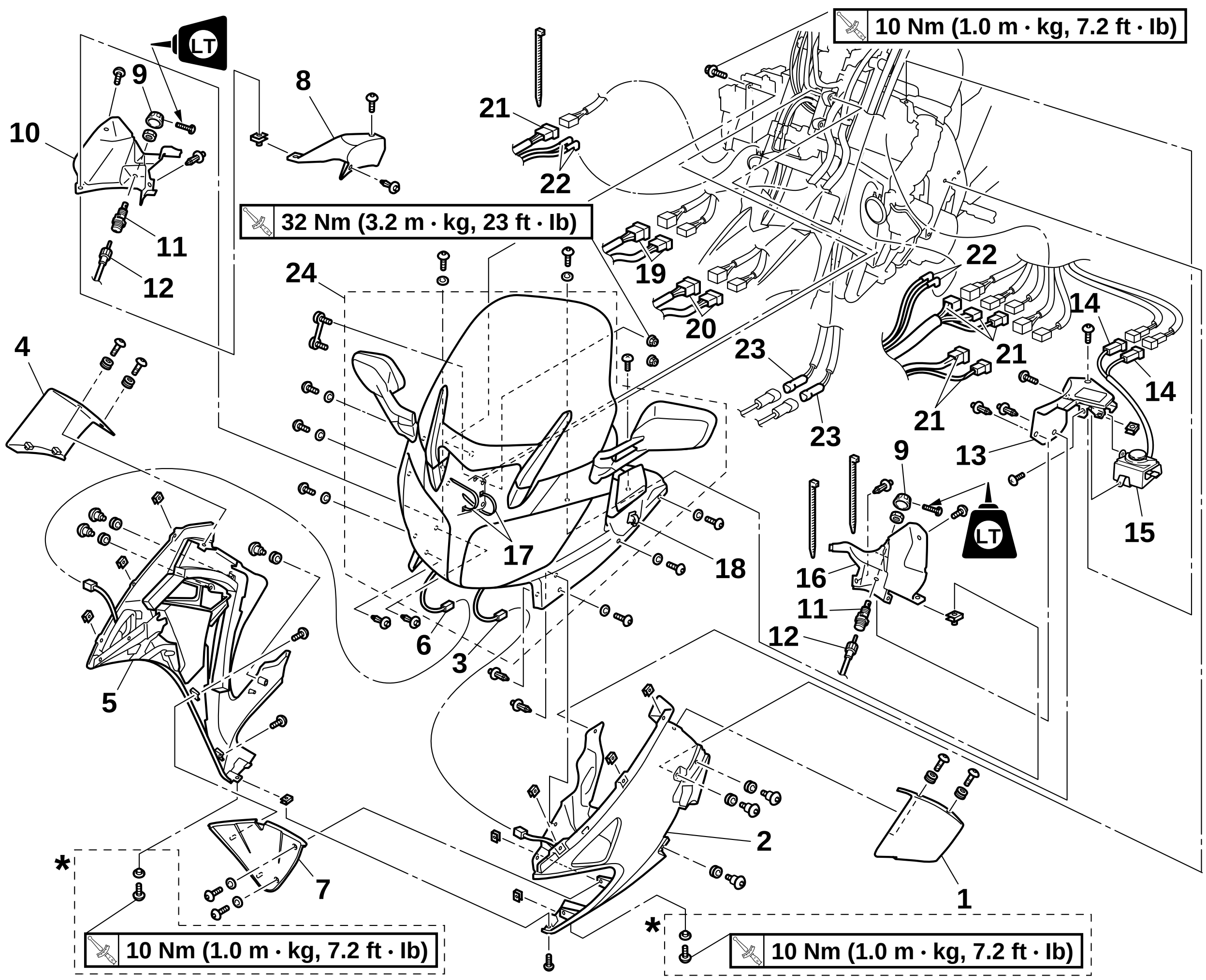
* For California only

Removing the front cowling assembly (FJR13AE)



Order	Job/Parts to remove	Q'ty	Remarks
	Open the accessory box lid.		
1	Left side panel	1	
2	Left side cowling	1	
3	Front left turn signal/position light coupler	1	Disconnect.
4	Right side panel	1	
5	Right side cowling	1	
6	Front right turn signal/position light coupler	1	Disconnect.
7	Bottom cowling	1	
8	Front cowling right inner panel 1	1	
9	Headlight beam adjusting knob	2	
10	Front cowling right inner panel 2	1	
11	Adjusting knob shaft	2	
12	Headlight beam adjusting cable	2	Disconnect.
13	Front cowling left inner panel 1	1	
14	Grip warmer control unit coupler	2	Disconnect.
15	Grip warmer control unit	1	
16	Front cowling left inner panel 2	1	

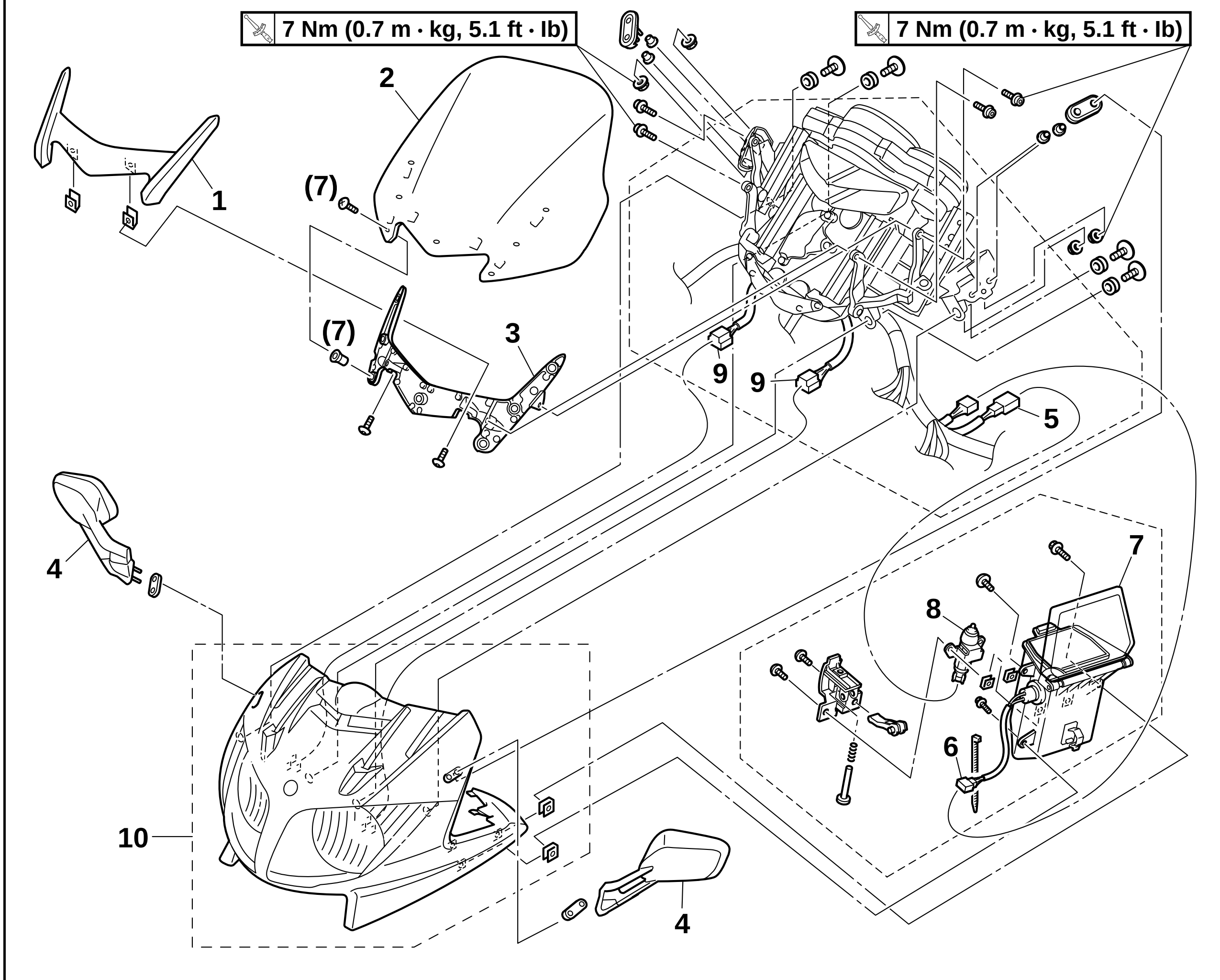
Removing the front cowling assembly (FJR13AE)



Order	Job/Parts to remove	Q'ty	Remarks
17	Plastic band	2	Disconnect.
18	Plastic holder	1	Disconnect.
19	Handlebar switch coupler	2	Disconnect.
20	Hand shift switch coupler	2	Disconnect.
21	Front cowling wire harness coupler	6	Disconnect.
22	Horn connector	4	Disconnect.
23	Grip warmer coupler	2	Disconnect.
24	Front cowling assembly	1	
			For installation, reverse the removal procedure.

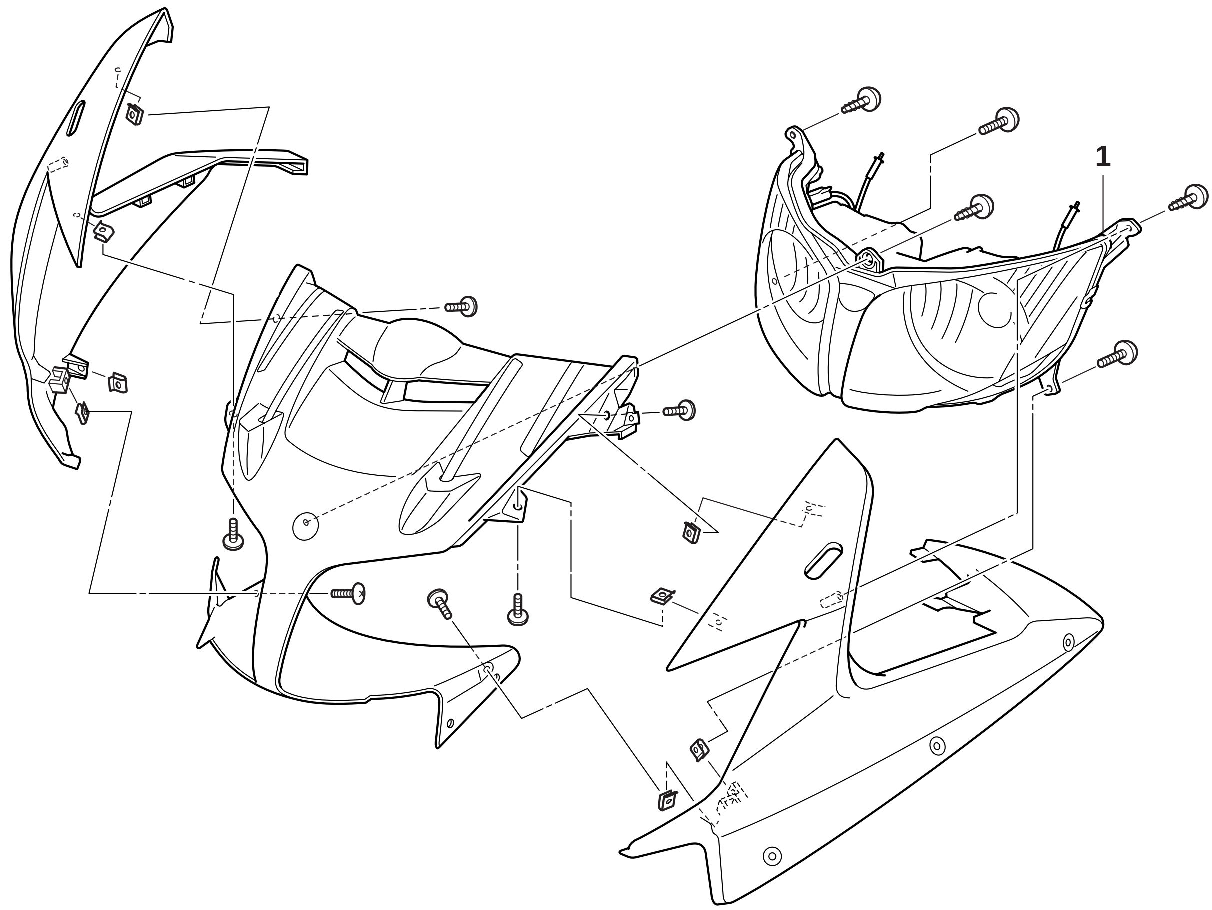
* For California only

Disassembling the front cowling assembly



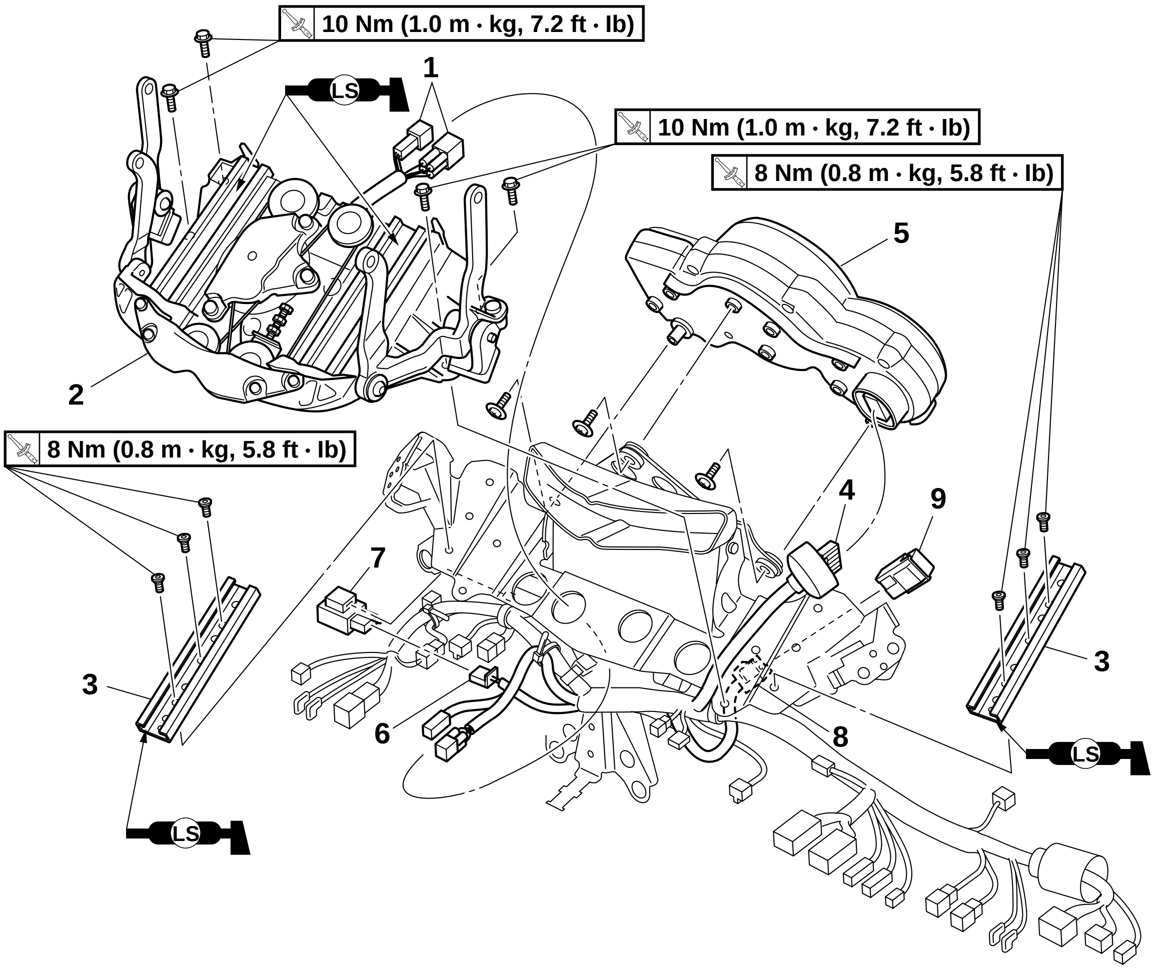
Order	Job/Parts to remove	Q'ty	Remarks
	Front cowling assembly		Refer to "Removing the front cowling assembly".
1	Windshield outer bracket	1	
2	Windshield	1	
3	Windshield inner bracket	1	
4	Rearview mirror	2	
5	Accessory box solenoid coupler	1	Disconnect.
6	Auxiliary DC jack coupler	1	Disconnect.
7	Accessory box	1	
8	Accessory box solenoid	1	
9	Headlight coupler	2	Disconnect.
10	Front cowling	1	
			For assembly, reverse the disassembly procedure.

Removing the headlight assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Front cowling		Refer to "Disassembling the front cowling assembly".
1	Headlight assembly	1	
			For installation, reverse the removal procedure.

Removing the windshield drive unit, meter assembly, and relays

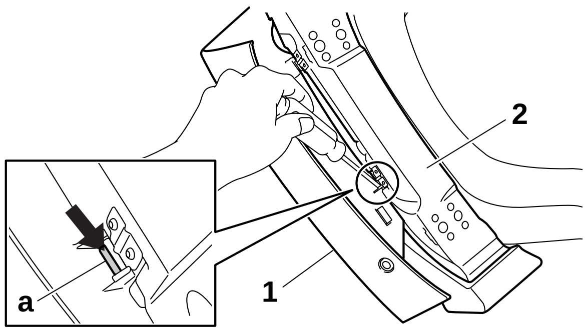


Order	Job/Parts to remove	Q'ty	Remarks
	Front cowling stay		Refer to "Disassembling the front cowling assembly".
1	Windshield drive unit coupler	2	Disconnect.
2	Windshield drive unit	1	
3	Windshield drive unit side rail	2	
4	Meter assembly coupler	1	Disconnect.
5	Meter assembly	1	
6	Turn signal/hazard relay coupler	1	Disconnect.
7	Turn signal/hazard relay	1	
8	Headlight relay (dimmer) coupler	1	Disconnect.
9	Headlight relay (dimmer)	1	
			For installation, reverse the removal procedure.

ET3P61037
REMOVING THE SIDE PANELS
1. Remove:
   • Side panel “1”

TIP

To release a pin on the side panel “1” from its corresponding hinge on the side cowling “2”, push the end “a” of the hinge with a flathead screwdriver.



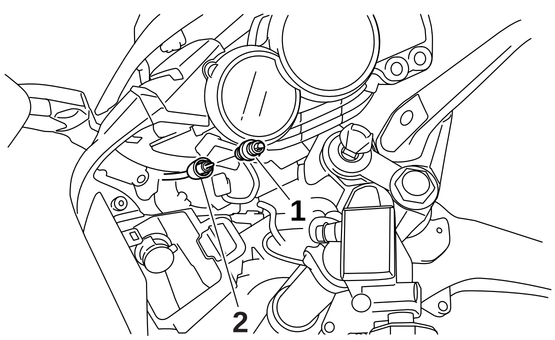
ET3P61038
INSTALLING THE FRONT COWLING LEFT INNER PANEL 2
1. Install:
   • Front cowling left inner panel 2

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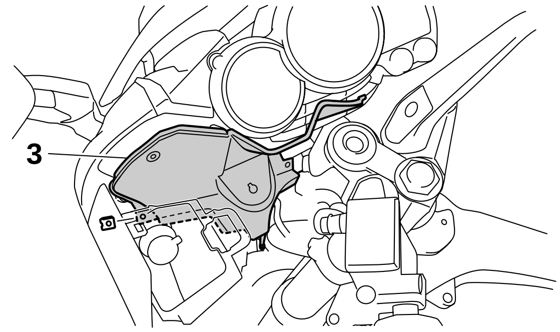
EC3P61038
NOTICE

When installing the panels onto the vehicle, be careful not to damage the panels or the vehicle itself.

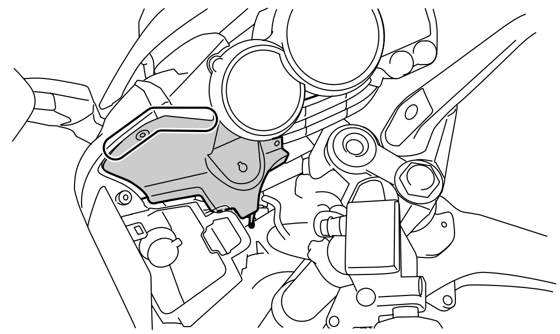
a. Turn the main switch to “ON”, and then open the accessory box lid.
b. Turn the handlebar completely to the left.
c. Install the adjusting knob shaft “1” onto the left headlight beam adjusting cable “2”.



d. Place front cowling left inner panel 2 “3” between the front cowling assembly and the steering stem.



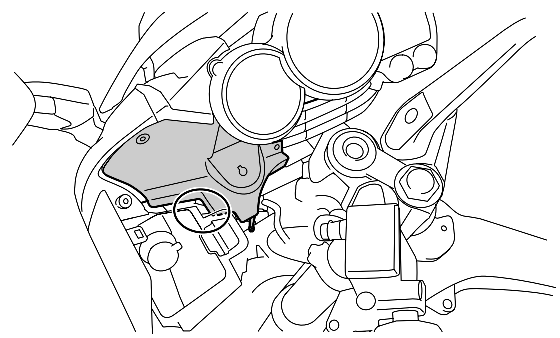
e. Fit the top and side of inner panel 2 into the front cowling assembly to the left of the meter assembly.



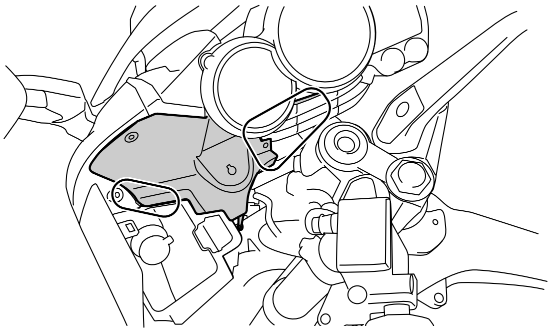
f. Fit inner panel 2 under the right side of the accessory box.

TIP

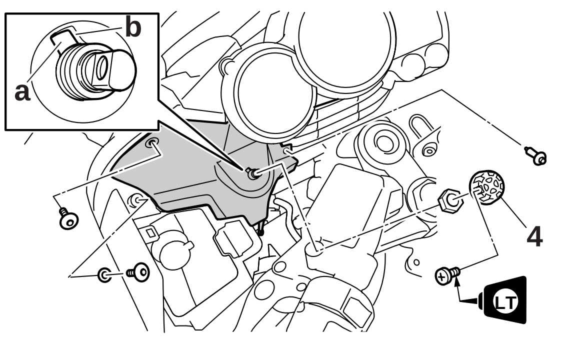
Pull the front cowling assembly outward when fitting the panel under the accessory box.



g. Fit the lower left corner of inner panel 2 into the front cowling assembly in front of the accessory box, making sure to align the bolt hole in the panel with the bolt hole in the cowling.
h. Push inner panel 2 inward, under the meter assembly.



i. Insert the adjusting knob shaft into the hole in inner panel 2, making sure to align the projection “a” on the shaft’s sleeve with the slot “b” in the panel, and then install the nut.
j. Install the headlight beam adjusting knob “4”.
k. Install the hexagon socket bolts and the quick fastener.

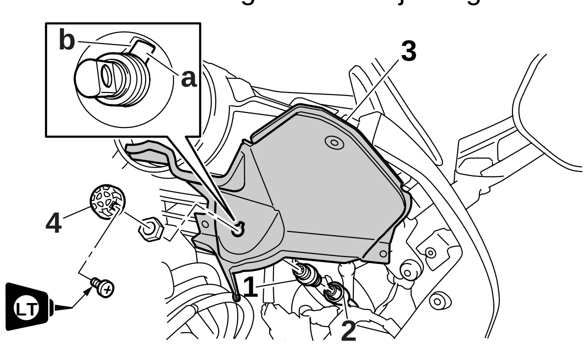


ET3P61039

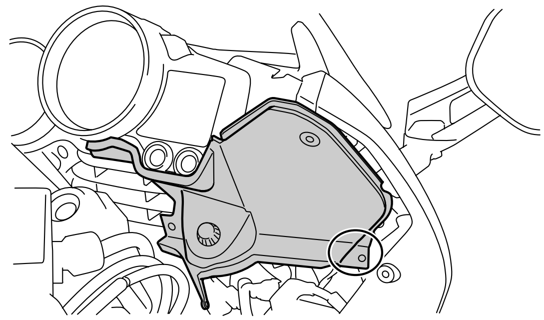
INSTALLING THE FRONT COWLING RIGHT INNER PANEL 2

1. Install:
   • Front cowling right inner panel 2

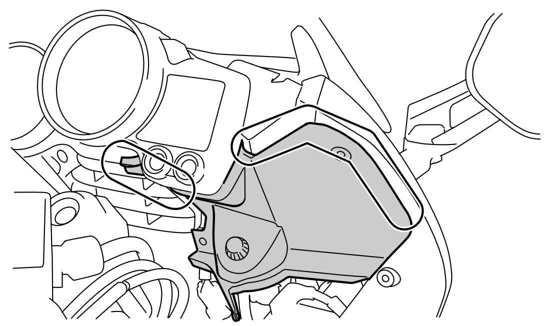
a. Turn the handlebar completely to the right.
b. Install the adjusting knob shaft “1” onto the right headlight beam adjusting cable “2”.
c. Insert the adjusting knob shaft into the hole in front cowling right inner panel 2 “3”, making sure to align the projection “a” on the shaft’s sleeve with the slot “b” in the panel, and then install the nut.
d. Install the headlight beam adjusting knob “4”.



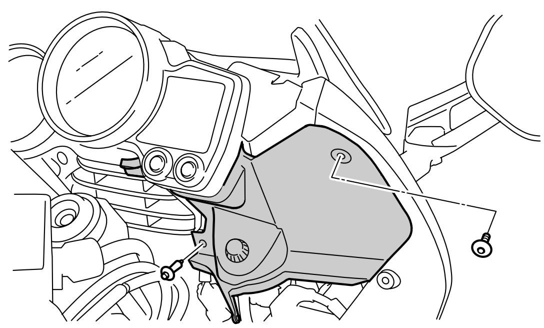
e. Fit the lower right corner of inner panel 2 into the front cowling assembly, making sure to align the bolt hole in the panel with the bolt hole in the cowling.



f. Fit the top and side of inner panel 2 into the front cowling assembly to the right of the meter assembly, and then push the panel inward, under the meter assembly.



g. Install the hexagon socket bolt and the quick fastener.



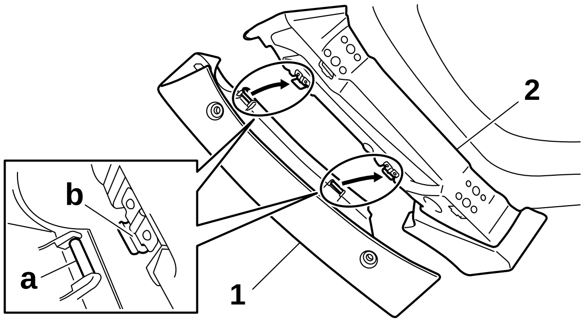
ET3P61040

INSTALLING THE SIDE PANELS

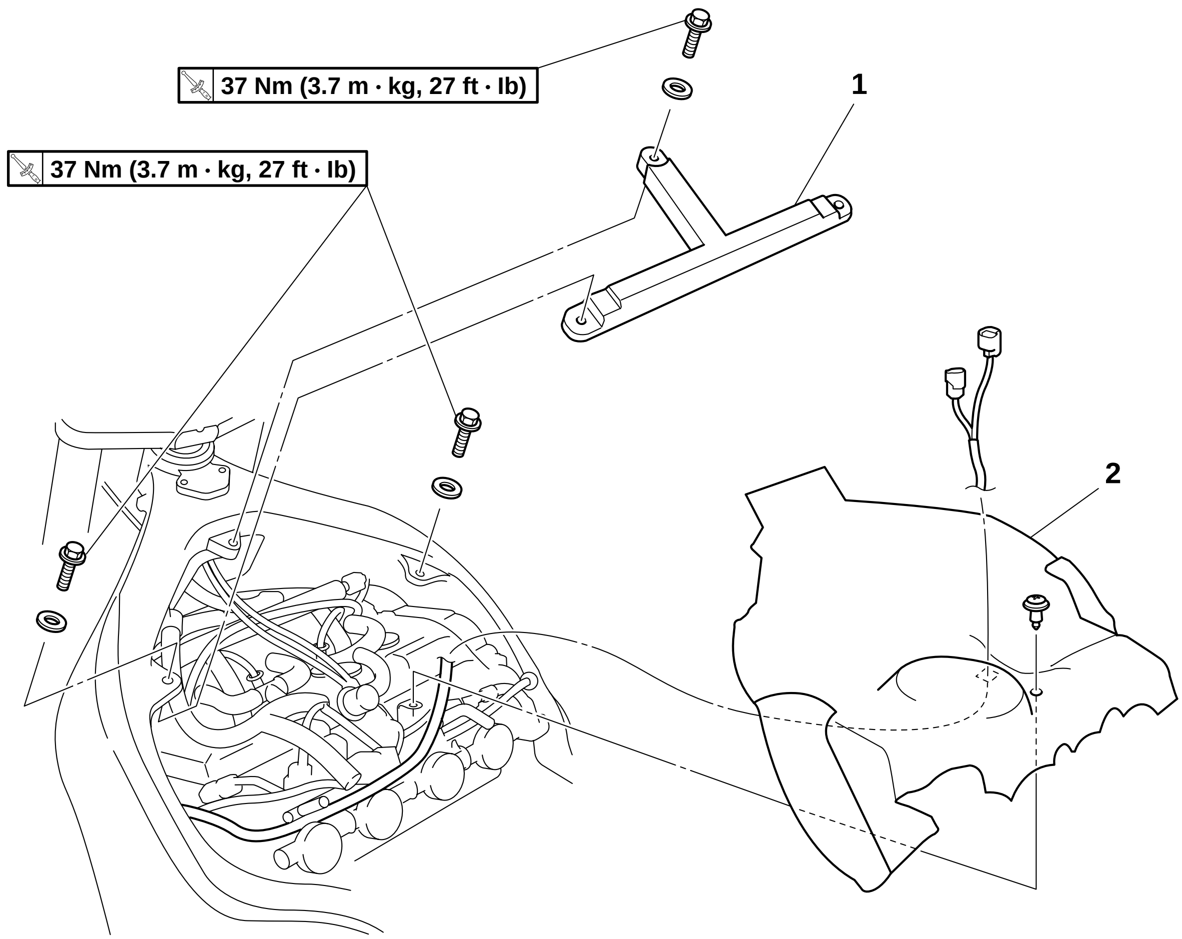
1. Install:
   • Side panels “1”

TIP

Be sure to fit each pin “a” on the side panels “1” into the groove “b” in its corresponding hinge on the side cowlings “2”.

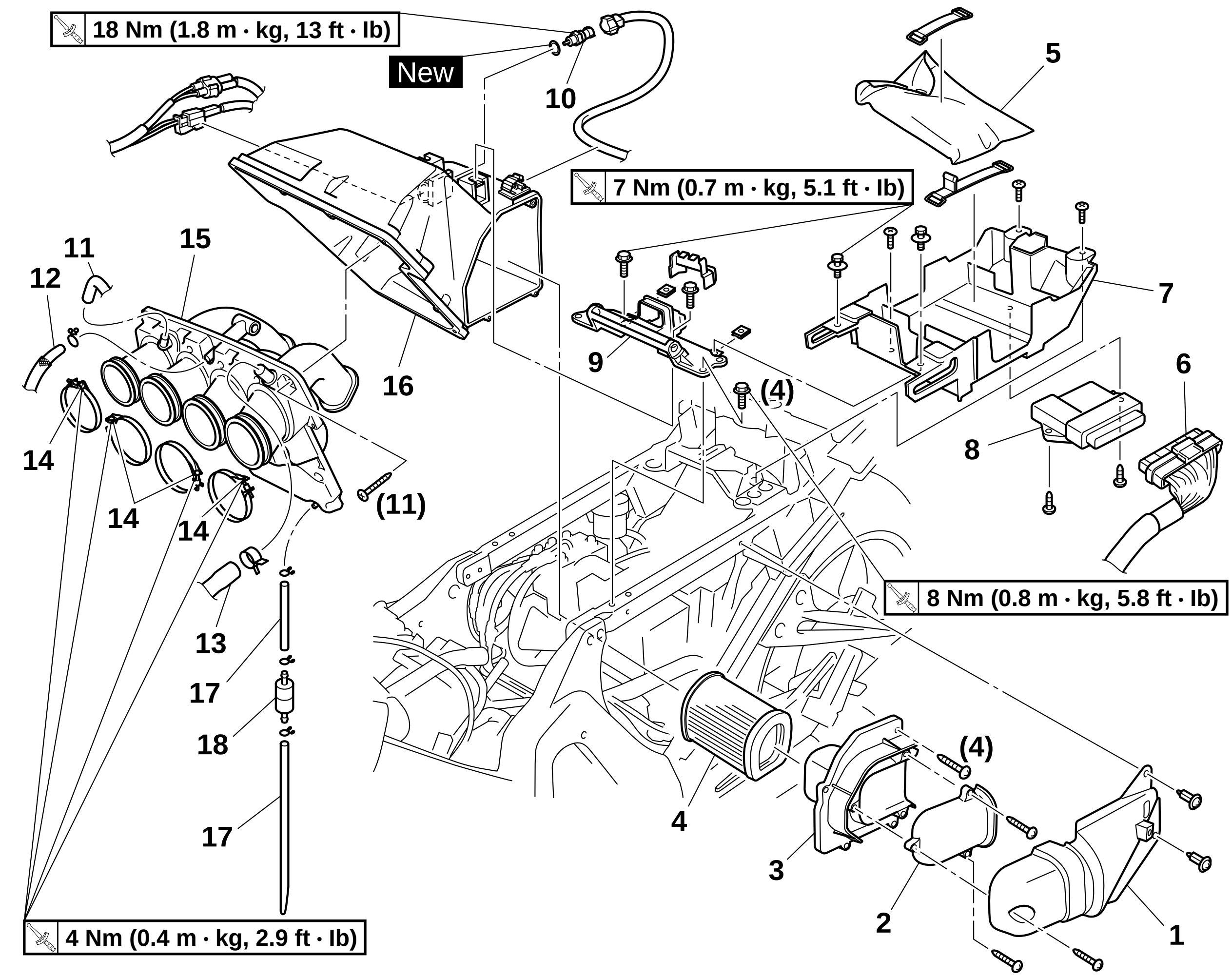

2
b
a
1

Removing the T-bar



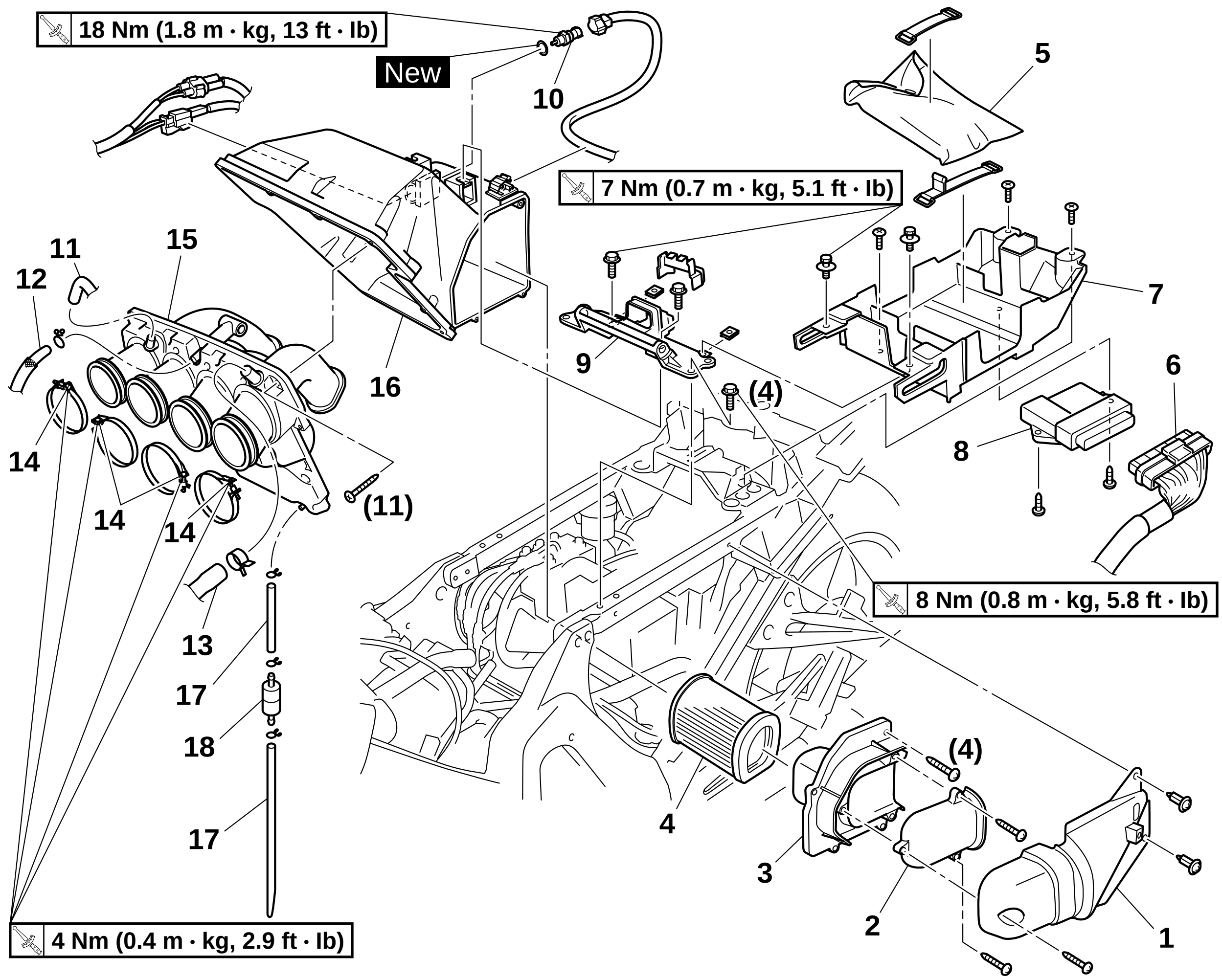
Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	T-bar	1	
2	Heat protector	1	
			For installation, reverse the removal procedure.

Removing the air filter case (FJR13A)



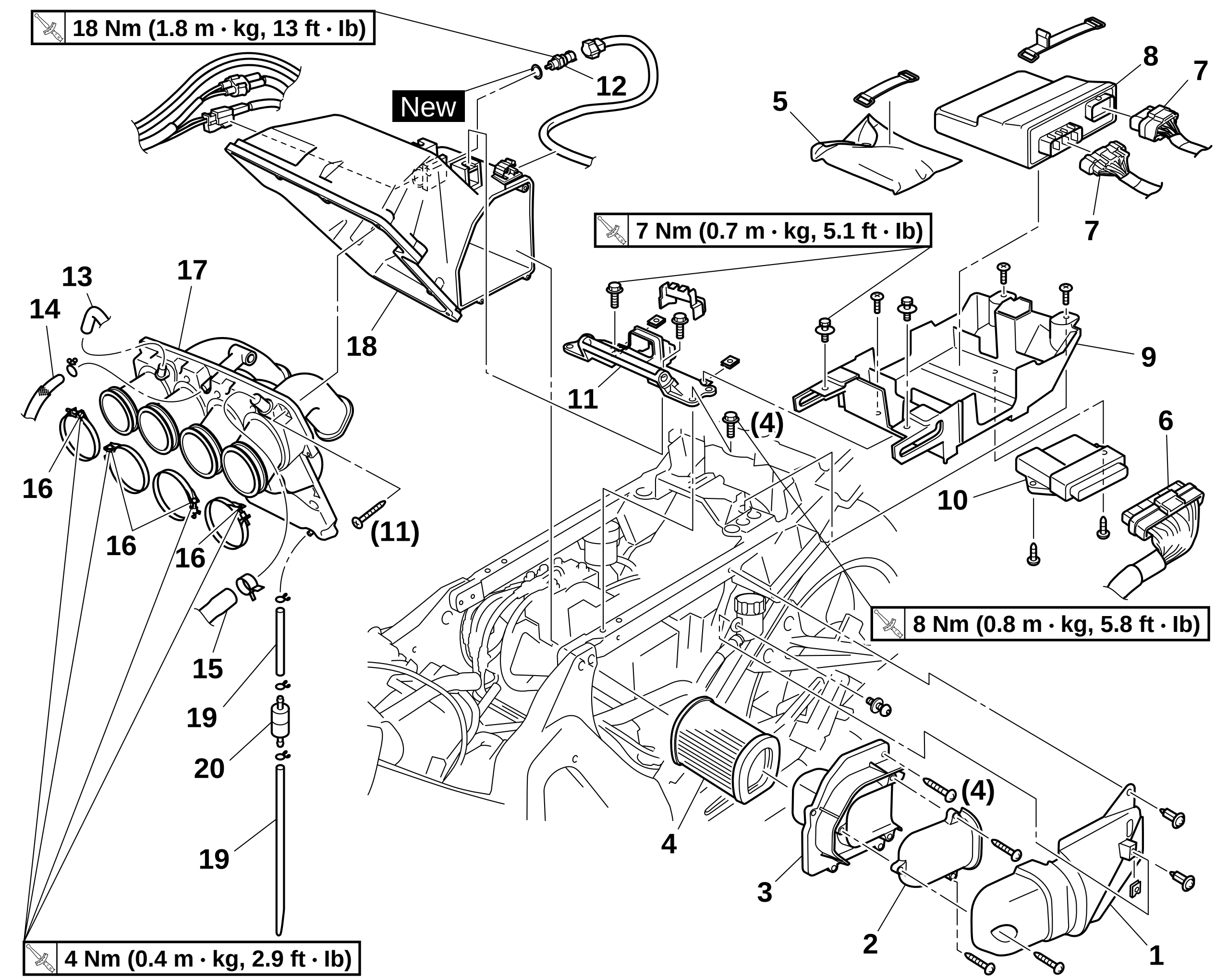
Order	Job/Parts to remove	Q'ty	Remarks
	Left side cover/T-bar		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	Air shroud	1	
2	Air duct	1	
3	Air filter case cover	1	
4	Air filter element	1	
5	Tool kit	1	
6	ECU coupler	1	Disconnect.
7	Storage compartment	1	
8	ECU (engine control unit)	1	
9	Rear lower fuel tank bracket	1	
10	Intake air temperature sensor	1	
11	Bypass air unit inlet hose	1	Disconnect.
12	Crankcase breather hose	1	Disconnect.
13	Air induction system hose (air filter case joint assembly to 3-way joint)	1	Disconnect.
14	Air filter case joint clamp screw	4	Loosen.

Removing the air filter case (FJR13A)



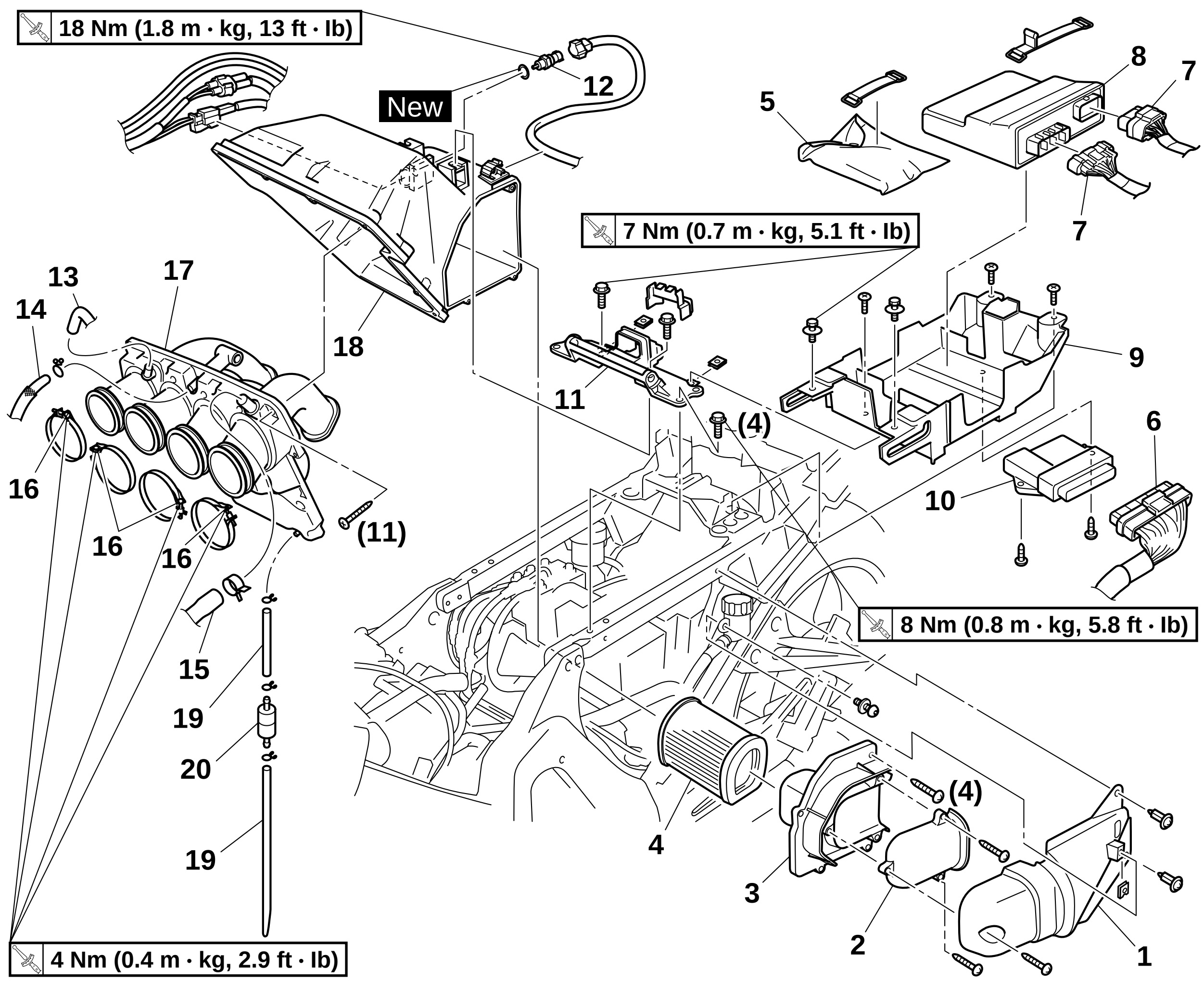
Order	Job/Parts to remove	Q'ty	Remarks
15	Air filter case joint assembly	1	
16	Air filter case	1	
17	Air filter case breather hose	2	
18	Filter assembly	1	
			For installation, reverse the removal procedure.

Removing the air filter case (FJR13AE)



Order	Job/Parts to remove	Q'ty	Remarks
	Left side cover/T-bar		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Shift actuator		Refer to "SHIFT ACTUATOR AND SHIFT ROD (FJR13AE only)" on page 5-73.
1	Air shroud	1	
2	Air duct	1	
3	Air filter case cover	1	
4	Air filter element	1	
5	Tool kit	1	
6	ECU coupler	1	Disconnect.
7	MCU coupler	2	Disconnect.
8	MCU	1	
9	Storage compartment	1	
10	ECU (engine control unit)	1	
11	Rear lower fuel tank bracket	1	
12	Intake air temperature sensor	1	
13	Bypass air unit inlet hose	1	Disconnect.

Removing the air filter case (FJR13AE)

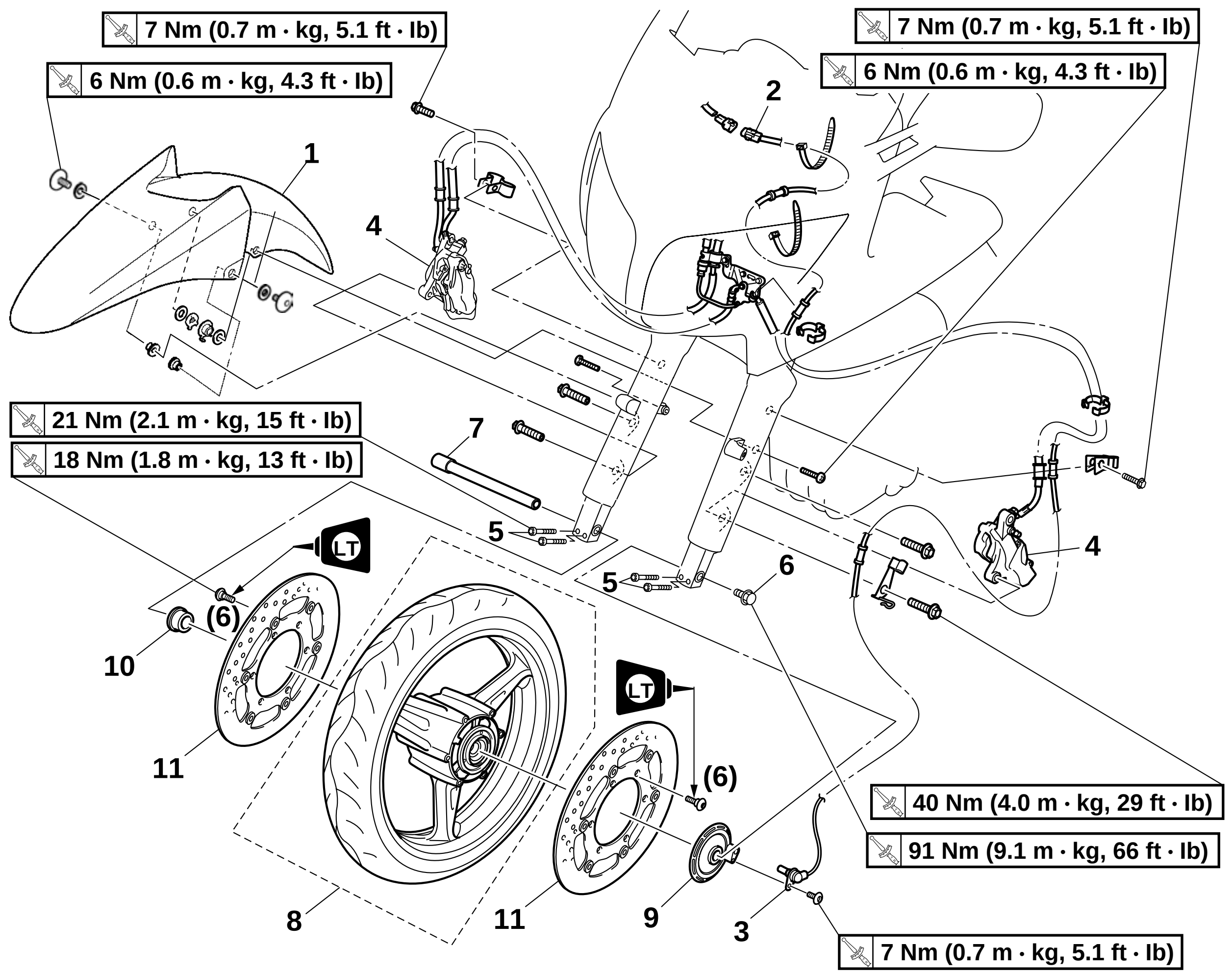


Order	Job/Parts to remove	Q'ty	Remarks
14	Crankcase breather hose	1	Disconnect.
15	Air induction system hose (air filter case joint assembly to 3-way joint)	1	Disconnect.
16	Air filter case joint clamp screw	4	Loosen.
17	Air filter case joint assembly	1	
18	Air filter case	1	
19	Air filter case breather hose	2	
20	Filter assembly	1	
			For installation, reverse the removal procedure.

EAS21880

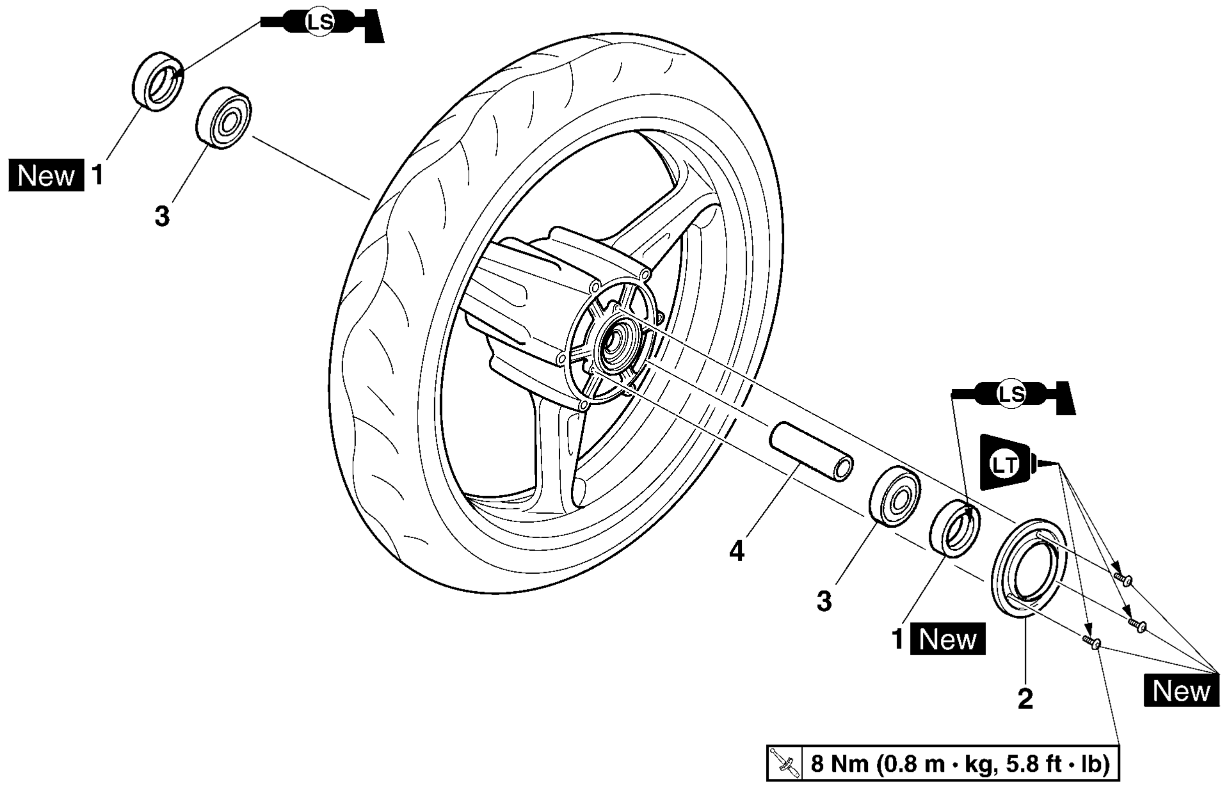
FRONT WHEEL

Removing the front wheel, brake discs, wheel sensor, and sensor housing



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat/T-bar		Refer to “GENERAL CHASSIS” on page 4-1.
	Fuel tank		Refer to “FUEL TANK” on page 7-1.
1	Front fender	1	
2	Front wheel sensor coupler	1	Disconnect.
3	Front wheel sensor	1	
4	Front brake caliper	2	
5	Front wheel axle pinch bolt	4	Loosen.
6	Front wheel axle bolt	1	
7	Front wheel axle	1	
8	Front wheel	1	
9	Front wheel sensor housing	1	
10	Collar	1	
11	Front brake disc	2	
			For installation, reverse the removal procedure.

Disassembling the front wheel

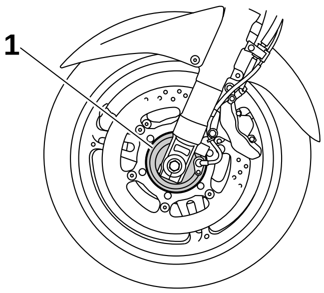


Order	Job/Parts to remove	Q'ty	Remarks
1	Oil seal	2	
2	Front wheel sensor rotor	1	
3	Wheel bearing	2	
4	Spacer	1	
			For assembly, reverse the disassembly procedure.

EAS21900
REMOVING THE FRONT WHEEL

ECA3P6D002
NOTICE

Keep magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the front wheel hub “1”, otherwise the wheel sensor rotor equipped in the wheel hub may be damaged, resulting in improper performance of the ABS system.



1. Stand the vehicle on a level surface.

EWA13120
WARNING

Securely support the vehicle so that there is no danger of it falling over.

2. Remove:
   - Front wheel sensor
   - Front brake calipers

ECA3P6D015
NOTICE

Do not operate the brake lever and brake pedal when removing the brake calipers.

3. Elevate:
   - Front wheel

TIP

Place the vehicle on a suitable stand so that the front wheel is elevated.

EAS21910
DISASSEMBLING THE FRONT WHEEL

ECA3P6D003
NOTICE

- **Keep magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the wheel sensor rotor.**
- **Do not drop the wheel sensor rotor or subject it to shocks.**
- **If any solvent gets on the wheel sensor rotor, wipe it off immediately.**

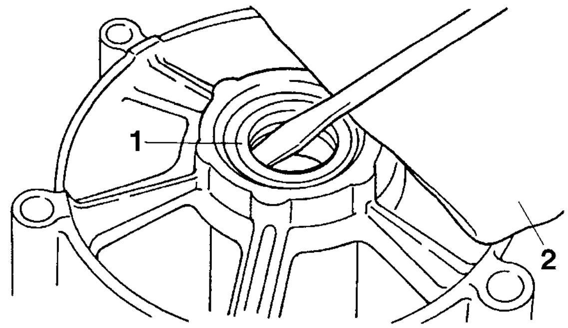
1. Remove:
   - Oil seals
   - Wheel bearings

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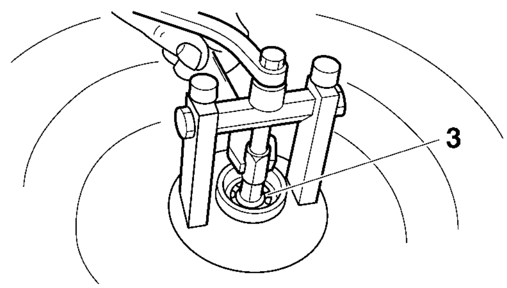
a. Clean the surface of the front wheel hub.
b. Remove the oil seals “1” with a flathead screwdriver.

TIP

To prevent damaging the wheel or wheel sensor rotor, place a rag “2” between the screwdriver and the surface of the wheel or rotor.



c. Remove the wheel sensor rotor.
d. Remove the wheel bearings “3” with a general bearing puller.



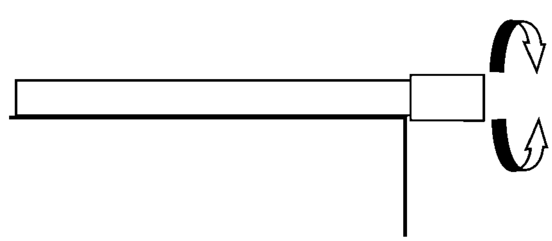
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EAS21920
CHECKING THE FRONT WHEEL

1. Check:
   - Wheel axle
     Roll the wheel axle on a flat surface.
     Bends → Replace.

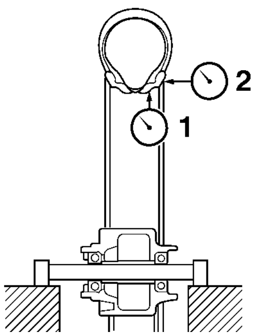
EWA13460
WARNING

Do not attempt to straighten a bent wheel axle.

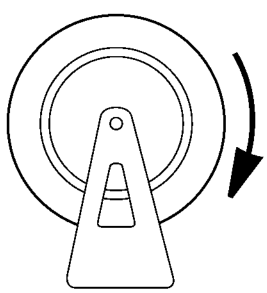


2. Check:
   - Tire
   - Front wheel
     Damage/wear → Replace.
     Refer to "CHECKING THE TIRES" on page 3-40 and "CHECKING THE WHEELS" on page 3-42.
3. Measure:
   - Radial wheel runout "1"
   - Lateral wheel runout "2"
     Over the specified limits → Replace.

Radial wheel runout limit
1.0 mm (0.04 in)
Lateral wheel runout limit
0.5 mm (0.02 in)



4. Check:
   - Wheel bearings
     Front wheel turns roughly or is loose → Replace the wheel bearings.
   - Oil seals
     Damage/wear → Replace.



EAS22010

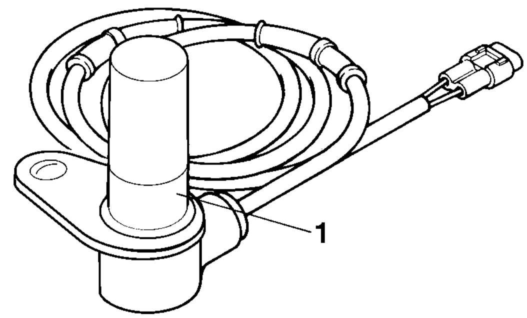
MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR

ECA3P6D004

NOTICE

- **Handle the ABS components with care since they have been accurately adjusted. Keep them away from dirt and do not subject them to shocks.**
- **The front wheel sensor cannot be disassembled. Do not attempt to disassemble it. If faulty, replace with a new one.**
- **Keep magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the wheel sensor rotor.**
- **Do not drop or shock the wheel sensor or the wheel sensor rotor.**

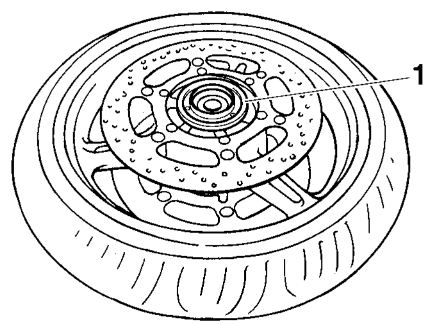
1. Check:
   - Front wheel sensor "1"
     Cracks/bends/distortion → Replace.
     Iron powder/dust → Clean.



2. Check:
   - Front wheel sensor rotor "1"
     Cracks/damage/scratches → Replace the front wheel sensor rotor.
     Iron powder/dust/solvent → Clean.

TIP

- The wheel sensor rotor is installed on the inner side of the wheel hub.
- When cleaning the wheel sensor rotor, be careful not to damage the surface of the rotor magnet.



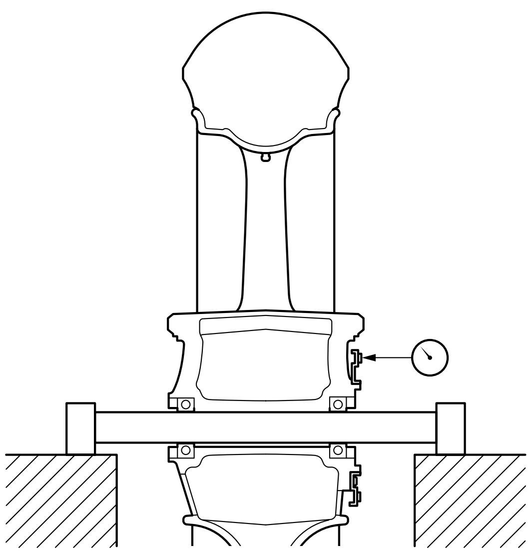
3. Measure:
   - Wheel sensor rotor deflection
     Out of specification → Clean the installation surface of the wheel sensor rotor and correct the wheel sensor rotor deflection, or replace the wheel sensor rotor.

Wheel sensor rotor deflection limit
0.14 mm (0.0055 in)

a. Hold the dial gauge at a right angle against the wheel sensor rotor surface.
b. Measure the wheel sensor rotor deflection.

TIP

Do not touch the surface of the rotor magnet with a sharp object.



c. If the deflection is above specification, remove the sensor rotor from the wheel, rotate it by one or two bolt holes, and then install it.

Wheel sensor rotor bolt
8 Nm (0.8 m·kg, 5.8 ft·lb)
LOCTITE®

ECA3P6D005
NOTICE

Replace the wheel sensor rotor bolts with new ones.

d. If the deflection is still above specification, replace the wheel sensor rotor.

EAS21960
ASSEMBLING THE FRONT WHEEL

ECA3P6D003
NOTICE

- **Keep magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the wheel sensor rotor.**
- **Do not drop the wheel sensor rotor or subject it to shocks.**
- **If any solvent gets on the wheel sensor rotor, wipe it off immediately.**

1. Install:
   - Wheel bearings New

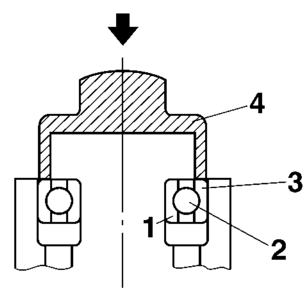
a. Install the new wheel bearing (right side).

EC3P61021
NOTICE

Do not contact the wheel bearing inner race "1" or balls "2". Contact should be made only with the outer race "3".

TIP

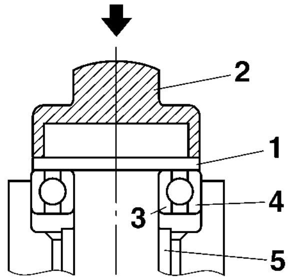
Use a socket "4" that matches the diameter of the wheel bearing outer race.



b. Install the spacer.
c. Install the new wheel bearing (left side).

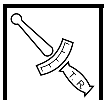
TIP

Place a suitable washer "1" between the socket "2" and the bearing so that both the inner race "3" and outer race "4" are pressed at the same time, and then press the bearing until the inner race makes contact with the spacer "5".



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2. Install:
   - Front wheel sensor rotor



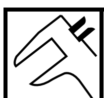
Front wheel sensor bolt
8 Nm (0.8 m·kg, 5.8 ft·lb)
LOCTITE®

ECA3P6D006

NOTICE

Replace the wheel sensor bolts with new ones.

3. Measure:
   - Wheel sensor rotor deflection
     Out of specification → Correct the wheel sensor rotor deflection or replace the wheel sensor rotor.
     Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20.



Wheel sensor rotor deflection limit
0.14 mm (0.0055 in)

EAS21970

ADJUSTING THE FRONT WHEEL STATIC BALANCE

TIP

- After replacing the tire, wheel, or both, the front wheel static balance should be adjusted.
- Adjust the front wheel static balance with the brake discs installed.

1. Remove:
   - Balancing weight(s)
2. Find:
   - Front wheel's heavy spot

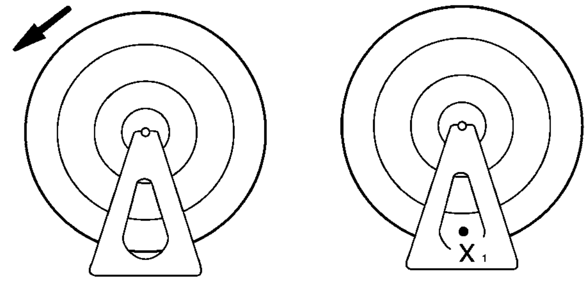
TIP

Place the front wheel on a suitable balancing stand.

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a. Spin the front wheel.

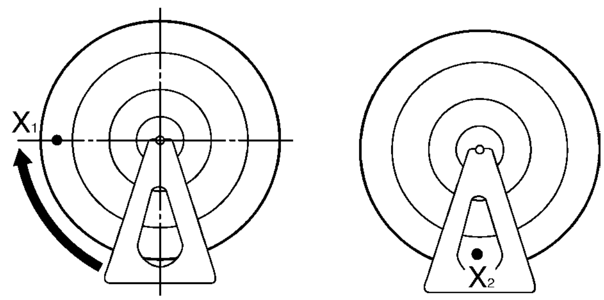
b. When the front wheel stops, put an "X_1" mark at the bottom of the wheel.



c. Turn the front wheel 90° so that the "X_1" mark is positioned as shown.

d. Release the front wheel.

e. When the wheel stops, put an "X_2" mark at the bottom of the wheel.



f. Repeat steps (c) through (e) several times until all the marks come to rest at the same spot.

g. The spot where all the marks come to rest is the front wheel's heavy spot "X".

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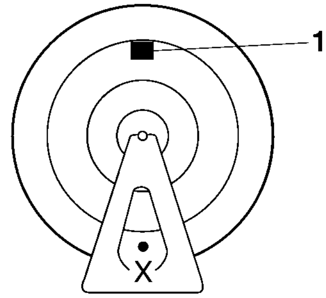
3. Adjust:
   - Front wheel static balance

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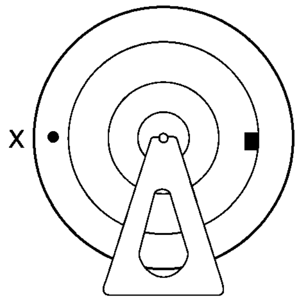
a. Install a balancing weight "1" onto the rim exactly opposite the heavy spot "X".

TIP

Start with the lightest weight.



b. Turn the front wheel 90° so that the heavy spot is positioned as shown.



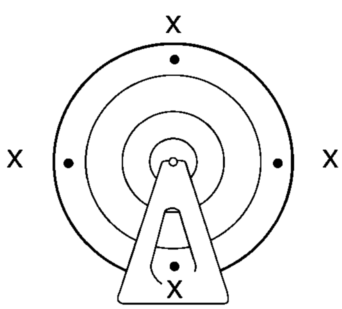
c. If the heavy spot does not stay in that position, install a heavier weight.
d. Repeat steps (b) and (c) until the front wheel is balanced.

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4. Check:
   - Front wheel static balance

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a. Turn the front wheel and make sure it stays at each position shown.



b. If the front wheel does not remain stationary at all of the positions, rebalance it.

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EAS22000

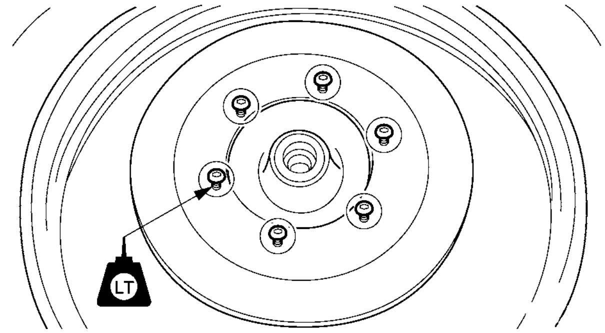
INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)

1. Install:
   - Front brake discs

	Front brake disc bolt **18 Nm (1.8 m·kg, 13 ft·lb)** **LOCTITE®**

TIP

Tighten the brake disc bolts in stages and in a crisscross pattern.



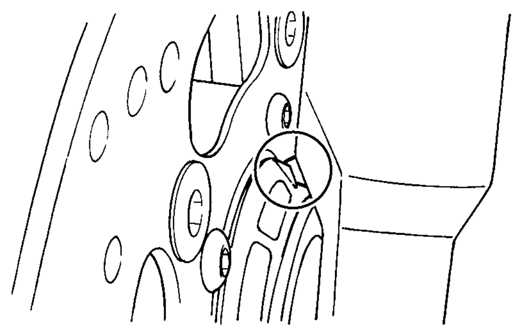
2. Check:
   - Front brake discs
     Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-37.
3. Lubricate:
   - Oil seal lips

	Recommended lubricant **Lithium-soap-based grease**

4. Install:
   - Collar
   - Front wheel sensor housing
   - Front wheel

TIP

Align the slot in the front wheel sensor housing with the projection of the front fork before assembly.



5. Install:
   - Front wheel axle
   - Front wheel axle bolt
   - Front wheel axle pinch bolts

	Front wheel axle bolt **91 Nm (9.1 m·kg, 66 ft·lb)** **Front wheel axle pinch bolt** **21 Nm (2.1 m·kg, 15 ft·lb)**

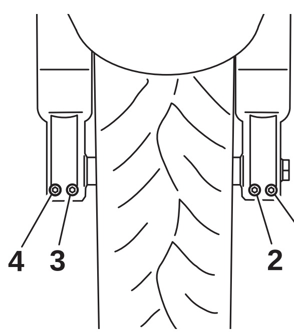
EC3P61022

NOTICE

Before tightening the wheel axle bolt, push down hard on the handlebars several times and check if the front fork rebounds smoothly.

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a. Insert the front wheel axle from the right side and tighten it with the front wheel axle bolt from the left side to 91 Nm (9.1 m·kg, 66 ft·lb).
b. In the order pinch bolt "2" → pinch bolt "1" → pinch bolt "2", tighten each bolt to 21 Nm (2.1 m·kg, 15 ft·lb) without performing temporary tightening.
c. Check that the right end of the front wheel axle is flush with the front fork. If necessary, manually push the front wheel axle or lightly tap it with a soft hammer until its end is flush with the front fork. However, if the surface of the front wheel axle end is not parallel to the surface of the front fork, align a point on the outer edge of the axle with the fork, making sure that the axle does not protrude past the fork.
d. In the order pinch bolt "4" → pinch bolt "3" → pinch bolt "4", tighten each bolt to 21 Nm (2.1 m·kg, 15 ft·lb) without performing temporary tightening.



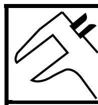
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6. Measure:

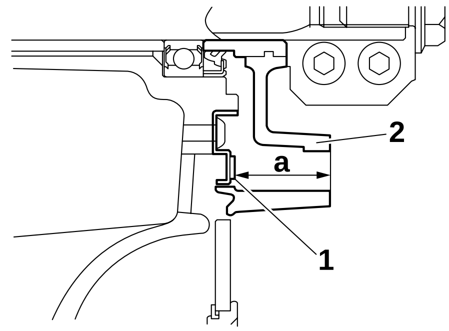
TIP

Measure the distance "a" only if the wheel bearings, wheel sensor rotor, or both were replaced.

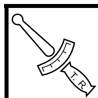
- Distance "a"
  (between the wheel sensor rotor "1" and wheel sensor housing "2")
  Out of specification → Reinstall the bearing or replace the wheel sensor rotor.



Distance "a" (between the wheel sensor rotor and wheel sensor housing)
28.89–29.41 mm (1.137–1.158 in)



7. Install:
   - Front brake calipers
   - Front wheel sensor



Front brake caliper bolt
40 Nm (4.0 m·kg, 29 ft·lb)
Front wheel sensor bolt
7 Nm (0.7 m·kg, 5.1 ft·lb)

TIP

When installing the front wheel sensor, check the wheel sensor lead for twists and the sensor electrode for foreign materials.

EC3P66003

NOTICE

- **Make sure there are no foreign materials in the wheel hub. Foreign materials cause damage to the inner sensor rotor and wheel sensor.**
- **To route the front wheel sensor lead, refer to "CABLE ROUTING (FJR13A)" on page 2-45 and "CABLE ROUTING (FJR13AE)" on page 2-65.**

EWA13500

WARNING

Make sure the brake hose is routed properly.

8. Check:
   - Front wheel sensor installation
     Check if the wheel sensor housing is installed properly.
9. Install:
   - Front fender

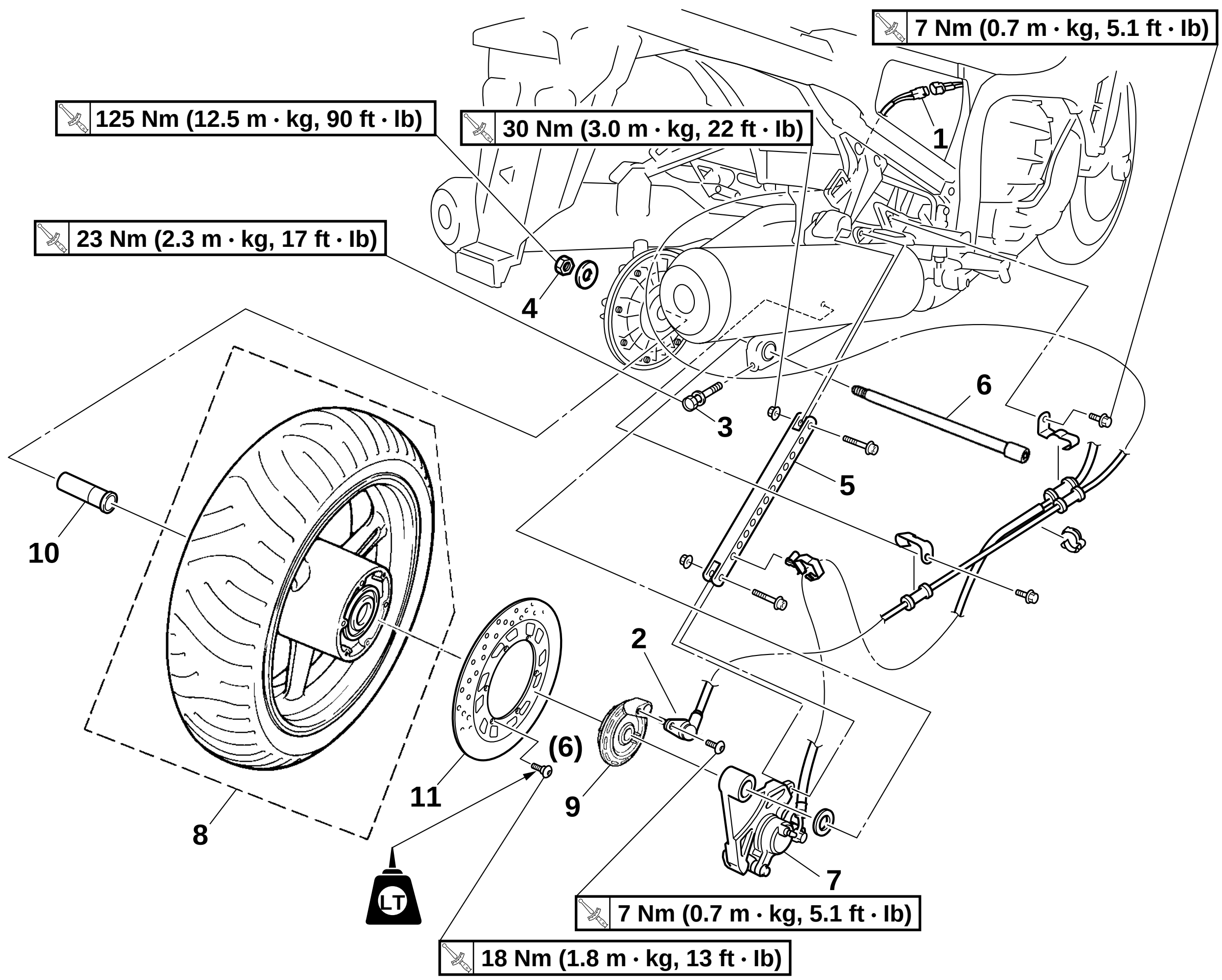
TIP

When installing the front fender, make sure that there is no dirt between the front fender and front fork legs.

EAS22030

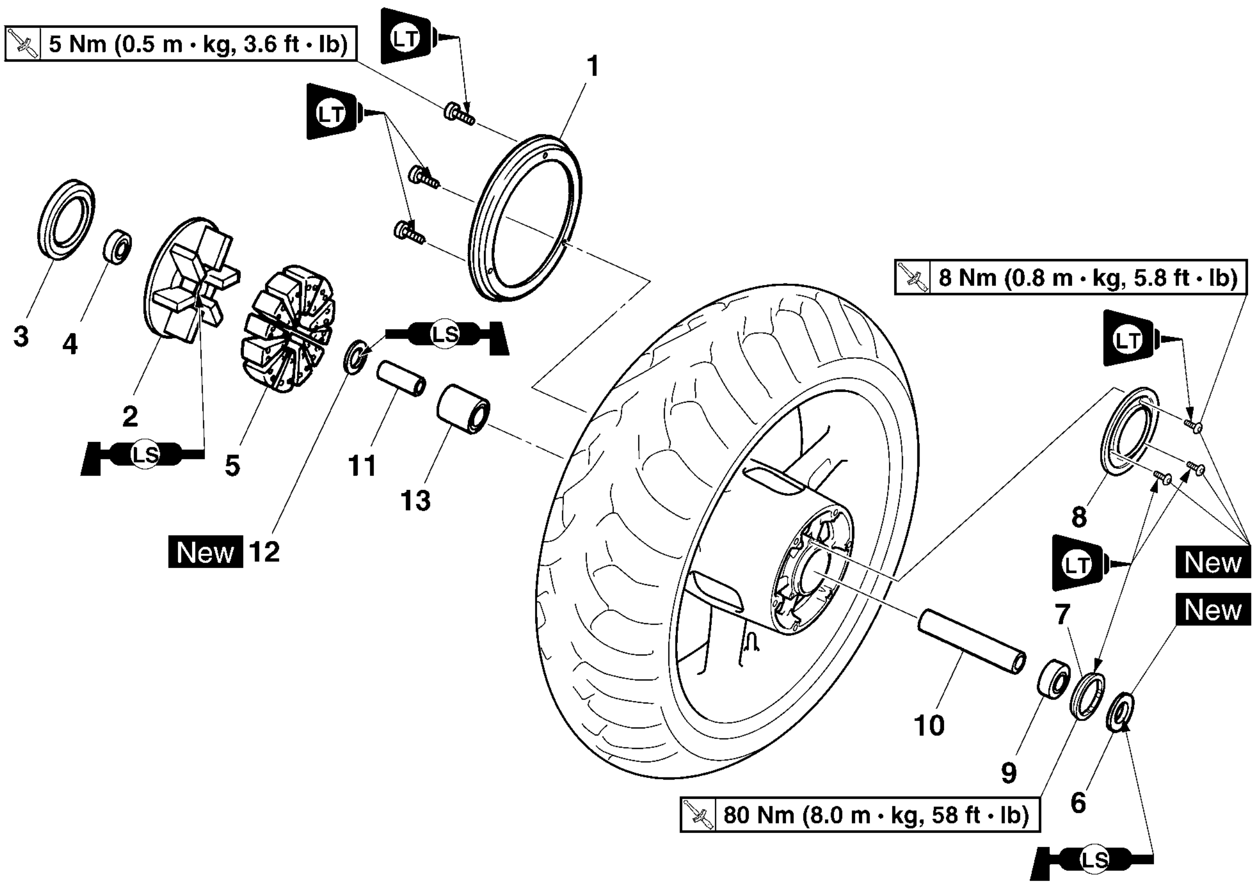
REAR WHEEL

Removing the rear wheel, brake disc, wheel sensor, and sensor housing



Order	Job/Parts to remove	Q'ty	Remarks
	Right side cover		Refer to "GENERAL CHASSIS" on page 4-1.
1	Rear wheel sensor coupler	1	Disconnect.
2	Rear wheel sensor	1	
3	Rear wheel axle pinch bolt	1	Loosen.
4	Rear wheel axle nut	1	
5	Brake torque rod	1	
6	Rear wheel axle	1	
7	Rear brake caliper	1	
8	Rear wheel	1	
9	Rear wheel sensor housing	1	
10	Collar	1	
11	Rear brake disc	1	
			For installation, reverse the removal procedure.

Disassembling the rear wheel



Order	Job/Parts to remove	Q'ty	Remarks
1	Dust cover	1	
2	Rear wheel drive hub	1	
3	Dust seal	1	
4	Wheel bearing	1	
5	Rear wheel drive hub damper	6	
6	Oil seal	1	
7	Bearing retainer	1	
8	Rear wheel sensor rotor	1	
9	Wheel bearing	1	
10	Spacer	1	
11	Spacer	1	
12	Oil seal	1	
13	Bearing	1	
			For assembly, reverse the disassembly procedure.

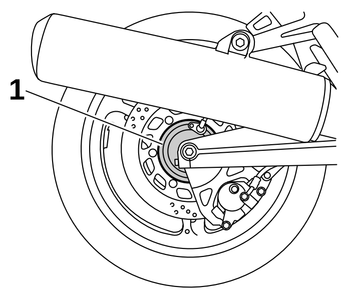
EAS22050

REMOVING THE REAR WHEEL

ECA3P6D013

NOTICE

Keep magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the rear wheel hub "1", otherwise the wheel sensor rotor equipped in the wheel hub may be damaged, resulting in improper performance of the ABS system.



1. Stand the vehicle on a level surface.

EWA13120

WARNING

Securely support the vehicle so that there is no danger of it falling over.

TIP

Place the vehicle on the centerstand so that the rear wheel is elevated.

2. Remove:
   - Rear wheel sensor
   - Rear wheel axle nut
   - Brake torque rod
   - Rear wheel axle
   - Rear brake caliper
   - Rear wheel
   - Rear wheel sensor housing

ECA3P6D016

NOTICE

- **Do not operate the brake pedal when removing the brake caliper.**
- **Be sure to remove the rear wheel sensor before removing the rear wheel sensor housing, otherwise the sensor could be damaged.**

TIP

Move the rear wheel to the right to separate it from the final drive assembly.

ET3P6D002

DISASSEMBLING THE REAR WHEEL

ECA3P6D003

NOTICE

- **Keep magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the wheel sensor rotor.**
- **Do not drop the wheel sensor rotor or subject it to shocks.**
- **If any solvent gets on the wheel sensor rotor, wipe it off immediately.**

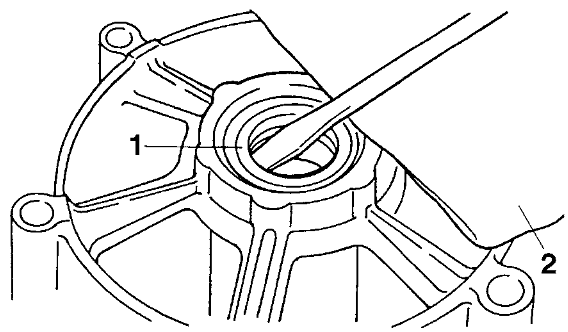
1. Remove:
   - Oil seals
   - Bearing retainer
   - Wheel bearings

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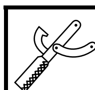
a. Clean the surface of the front wheel hub.
b. Remove the oil seals "1" with a flathead screwdriver.

TIP

To prevent damaging the wheel or wheel sensor rotor, place a rag "2" between the screwdriver and the surface of the wheel or rotor.



c. Loosen the bearing retainer "1" with a hexagon wrench (41) "2".

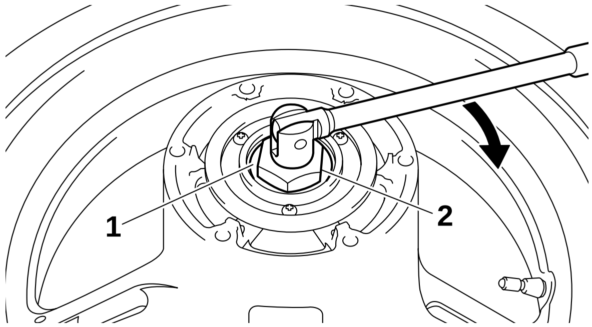


	Hexagon wrench (41) **90890-01525** **YM-01525**

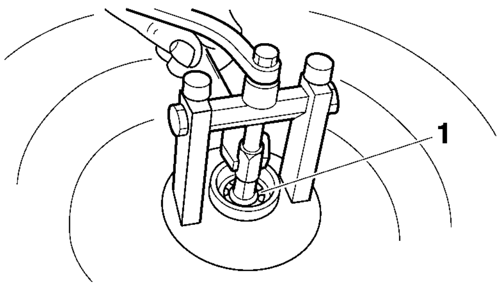
ECA3P6D007

NOTICE

The bearing retainer has left-handed threads. To loosen the retainer, turn it clockwise.



d. Remove the wheel sensor rotor.
e. Remove the wheel bearings “1” with a general bearing puller.



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EAS22090

CHECKING THE REAR WHEEL

1. Check:
   - Rear wheel axle
   - Rear wheel
   - Wheel bearings
   - Oil seals
   Refer to “CHECKING THE FRONT WHEEL” on page 4-19.
2. Check:
   - Tire
   - Rear wheel
   Damage/wear → Replace.
   Refer to “CHECKING THE TIRES” on page 3-40 and “CHECKING THE WHEELS” on page 3-42.
3. Measure:
   - Radial wheel runout
   - Lateral wheel runout
   Refer to “CHECKING THE FRONT WHEEL” on page 4-19.

Radial wheel runout limit
1.0 mm (0.04 in)
Lateral wheel runout limit
0.5 mm (0.02 in)

EAS22200

MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR

ECA3P6D008

NOTICE

- **Handle the ABS components with care since they have been accurately adjusted. Keep them away from dirt and do not subject them to shocks.**
- **The rear wheel sensor cannot be disassembled. Do not attempt to disassemble it. If faulty, replace with a new one.**
- **Keep magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the wheel sensor rotor.**
- **Do not drop or shock the wheel sensor or the wheel sensor rotor.**

1. Check:
   - Rear wheel sensor
   Refer to “MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-20.
2. Check:
   - Rear wheel sensor rotor
   Refer to “MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-20.
3. Measure:
   - Rear wheel sensor rotor deflection
   Refer to “MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-20.

EAS22140

ASSEMBLING THE REAR WHEEL

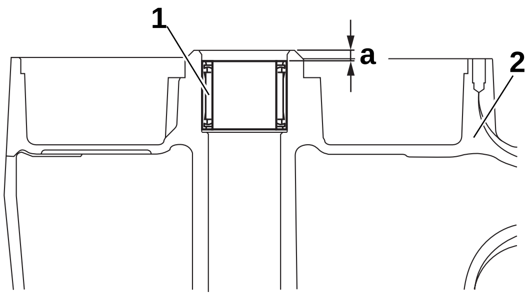
ECA3P6D003

NOTICE

- **Keep magnets (including magnetic pick-up tools, magnetic screwdrivers, etc.) away from the wheel sensor rotor.**
- **Do not drop the wheel sensor rotor or subject it to shocks.**
- **If any solvent gets on the wheel sensor rotor, wipe it off immediately.**

1. Install:
   - Bearing “1”

Installed depth of bearing “a”
3.5–4.5 mm (0.14–0.18 in)



2. Rear wheel

2. Install:
   - Wheel bearings **New**

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a. Install the new wheel bearings in the reverse order of disassembly.

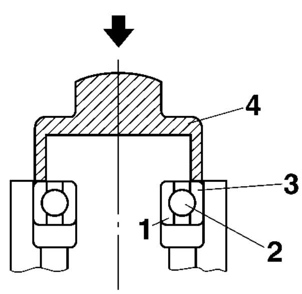
EC3P61021

NOTICE

Do not contact the wheel bearing inner race "1" or balls "2". Contact should be made only with the outer race "3".

TIP

Use a socket "4" that matches the diameter of the wheel bearing outer race.



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3. Install:
   - Rear wheel sensor rotor

Rear wheel sensor rotor bolt
8 Nm (0.8 m·kg, 5.8 ft·lb)
LOCTITE®

ECA3P6D006

NOTICE

Replace the wheel sensor bolts with new ones.

4. Install:
   - Bearing retainer

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a. Tighten the bearing retainer "1" with a hexagon wrench (41) "2".

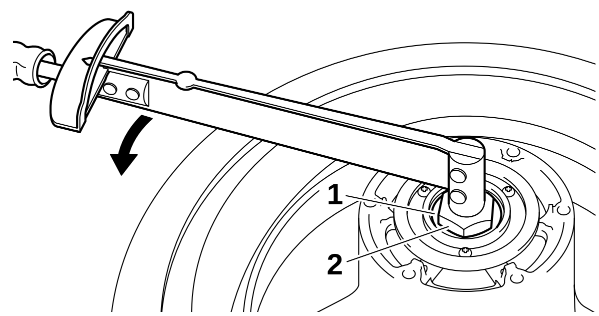
Hexagon wrench (41)
90890-01525
YM-01525

Bearing retainer
80 Nm (8.0 m·kg, 58 ft·lb)
LOCTITE®

ECA3P6D009

NOTICE

The bearing retainer has left-handed threads. To tighten the retainer, turn it counterclockwise.



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5. Measure:
   - Wheel sensor rotor deflection
     Out of specification → Correct the wheel sensor rotor deflection or replace the wheel sensor rotor.
     Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-28.

Wheel sensor rotor deflection limit
0.14 mm (0.0055 in)

EAS22150

ADJUSTING THE REAR WHEEL STATIC BALANCE

TIP

- After replacing the tire, wheel, or both, the rear wheel static balance should be adjusted.
- Adjust the rear wheel static balance with the brake disc and rear wheel drive hub installed.

1. Adjust:
   - Rear wheel static balance
     Refer to "ADJUSTING THE FRONT WHEEL STATIC BALANCE" on page 4-22.

EAS22170

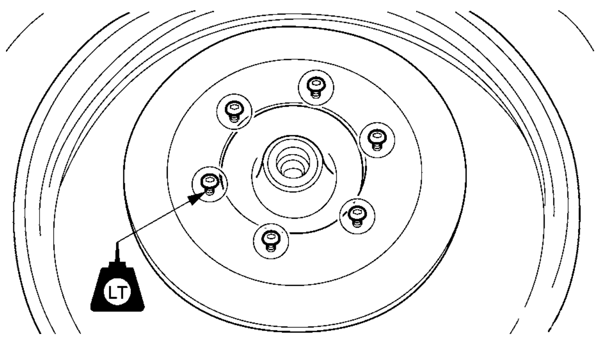
INSTALLING THE REAR WHEEL (REAR BRAKE DISC)

1. Install:
   - Rear brake disc

	Rear brake disc bolt **18 Nm (1.8 m·kg, 13 ft·lb)** **LOCTITE®**

TIP

Tighten the brake disc bolts in stages and in a crisscross pattern.



2. Check:
   - Rear brake disc
     Refer to “CHECKING THE REAR BRAKE DISC” on page 4-50.
3. Lubricate:
   - Oil seal lips

	Recommended lubricant **Lithium-soap-based grease**

4. Install:
   - Rear wheel sensor housing
   - Rear wheel
   - Rear brake caliper
   - Rear wheel axle
   - Brake torque rod
   - Rear wheel axle nut

TIP

- Align the slot “a” of the rear wheel sensor housing “1” with the projection “b” of the rear brake caliper bracket “2”, and then assemble them.
- After assembling the rear wheel sensor housing and the rear brake caliper bracket, make sure that the projection “c” on the housing is aligned with the projection “d” on the bracket.

ECA14470

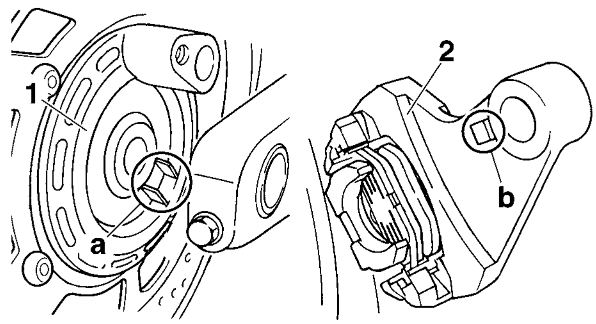
NOTICE

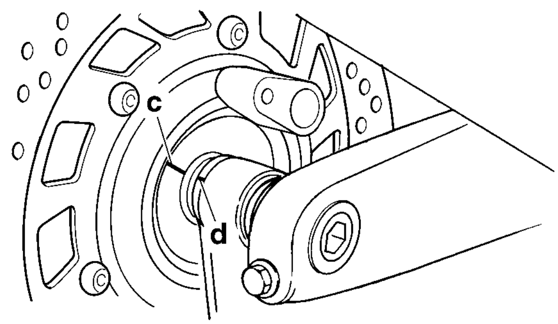
Make sure there are no foreign materials in the wheel hub. Foreign materials cause damage to the inner sensor rotor and wheel sensor.

EWA13500

WARNING

Make sure the brake hose is routed properly.





5. Tighten:
   - Brake torque rod nuts
   - Rear wheel axle nut
   - Rear wheel axle pinch bolt

	Brake torque rod nut **30 Nm (3.0 m·kg, 22 ft·lb)** **Rear wheel axle nut** **125 Nm (12.5 m·kg, 90 ft·lb)** **Rear wheel axle pinch bolt** **23 Nm (2.3 m·kg, 17 ft·lb)**

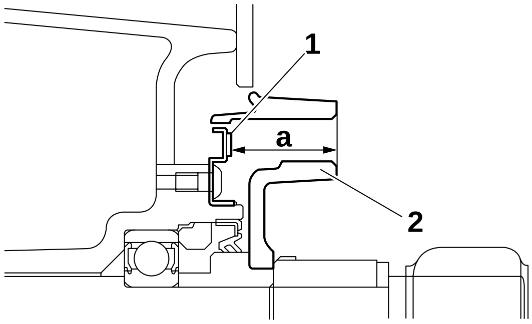
6. Measure:

TIP

Measure the distance “a” only if the wheel bearings, wheel sensor rotor, or both were replaced.

- Distance “a”
  (between the wheel sensor rotor “1” and wheel sensor housing “2”)
  Out of specification → Reinstall the bearing or replace the wheel sensor rotor.

Distance "a" (between the wheel sensor rotor and wheel sensor housing)
28.89–29.41 mm (1.137–1.158 in)



7. Install:
   - Rear wheel sensor

Rear wheel sensor bolt
7 Nm (0.7 m·kg, 5.1 ft·lb)

EC3P66004

NOTICE

To route the rear wheel sensor lead, refer to "CABLE ROUTING (FJR13A)" on page 2-45 and "CABLE ROUTING (FJR13AE)" on page 2-65.

TIP

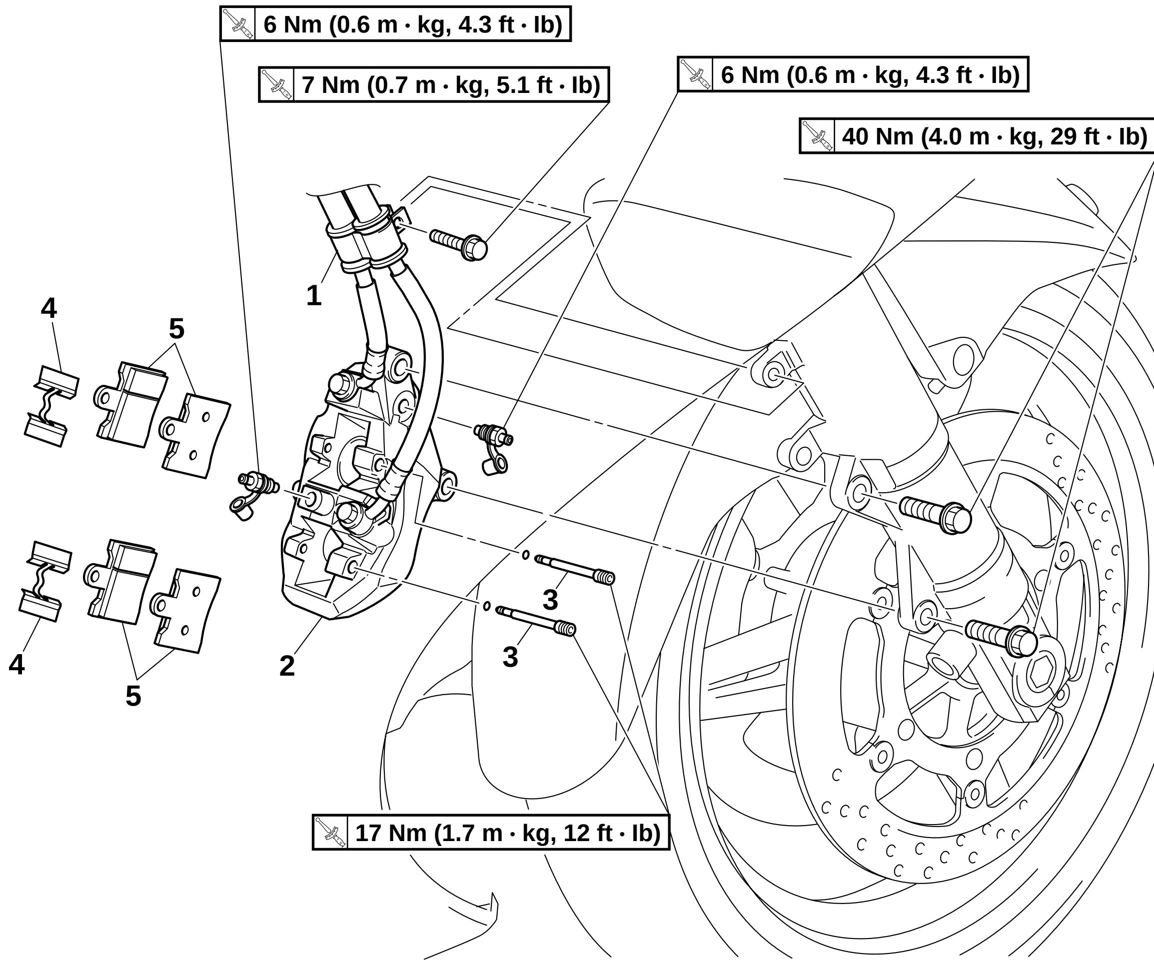
When installing the rear wheel sensor, check the rear wheel sensor lead for twists and the sensor electrode for foreign materials.

8. Check:
   - Rear wheel sensor installation
     Check if the wheel sensor housing is installed properly.

EAS22210

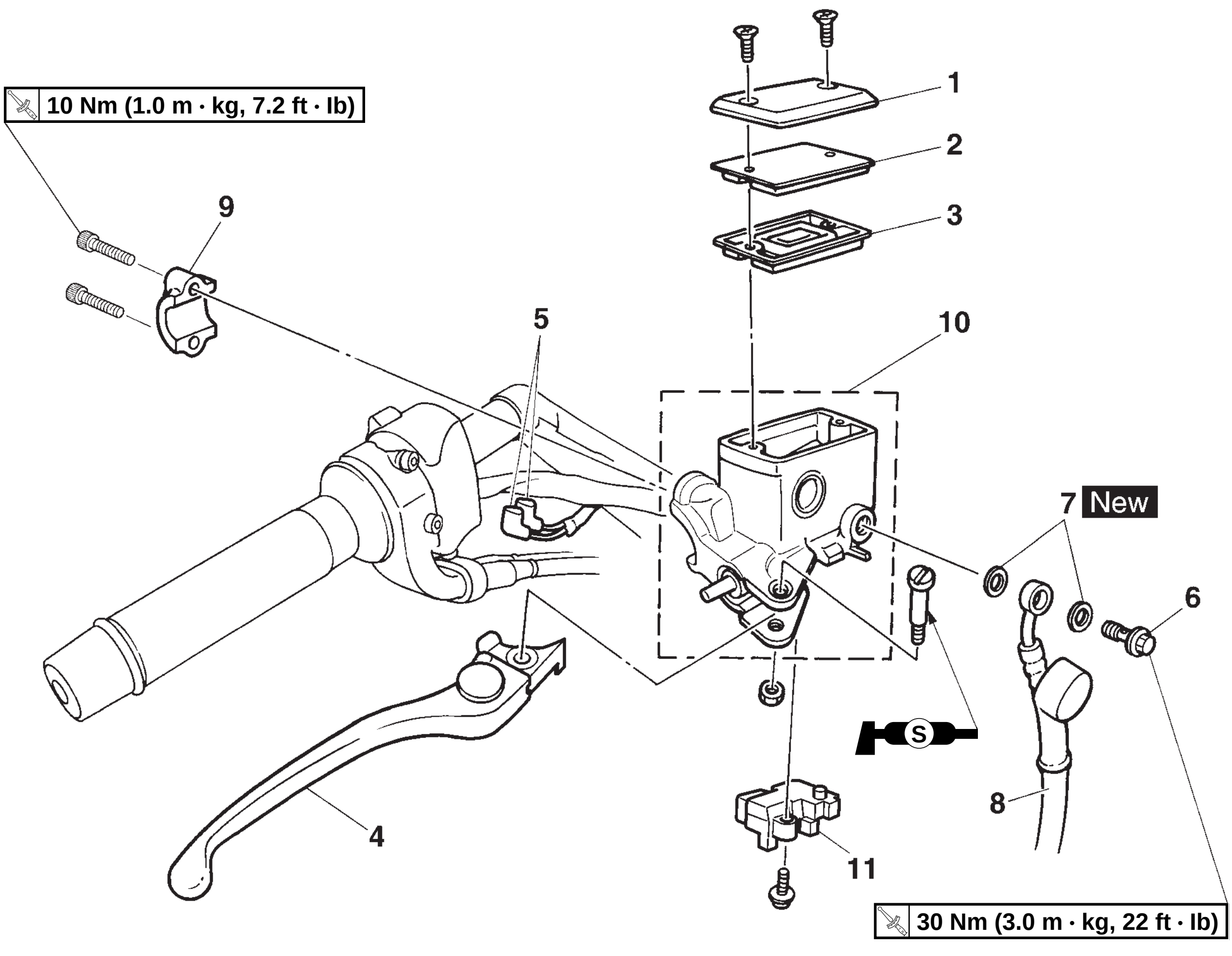
FRONT BRAKE

Removing the front brake pads



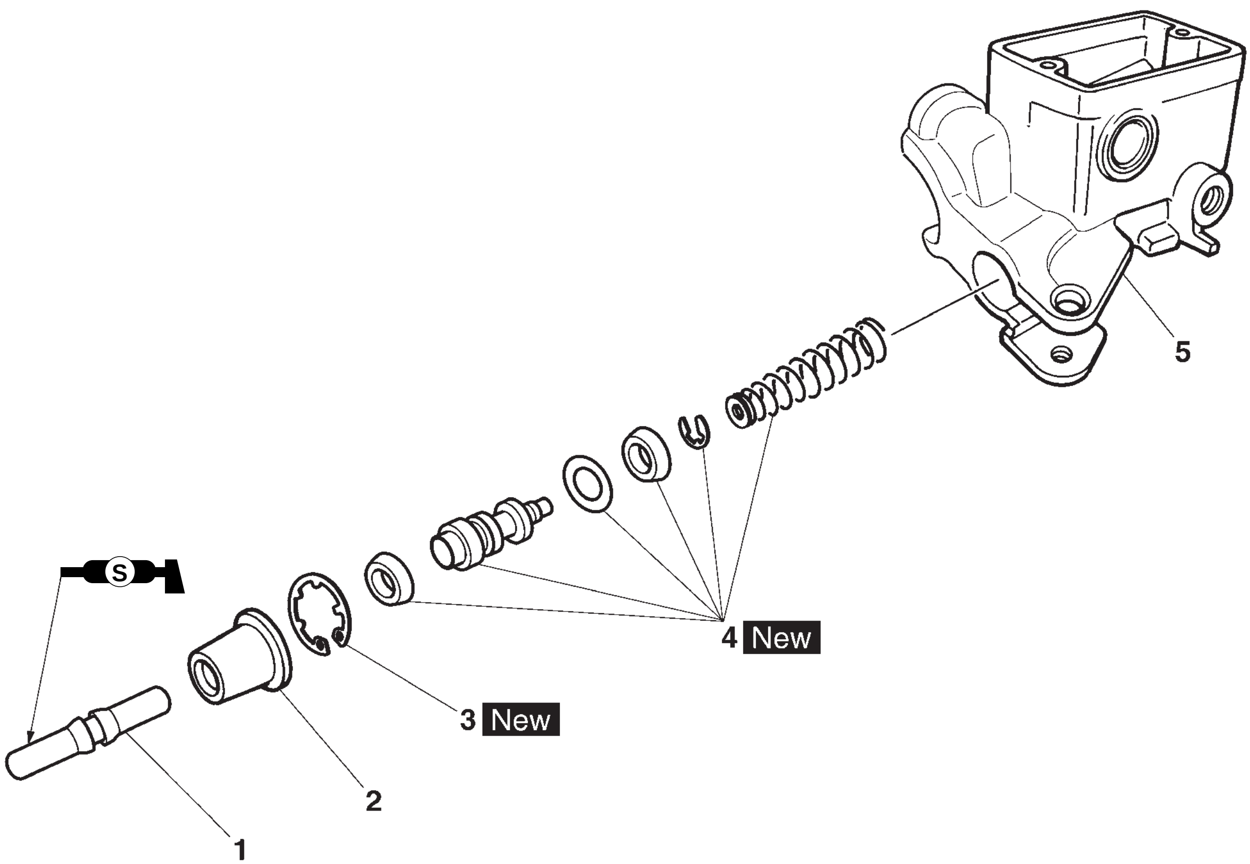
Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front brake calipers.
1	Brake hose holder	1	
2	Front brake caliper	1	
3	Brake pad bolt	2	
4	Brake pad spring	2	
5	Front brake pad	4	
			For installation, reverse the removal procedure.

Removing the front brake master cylinder



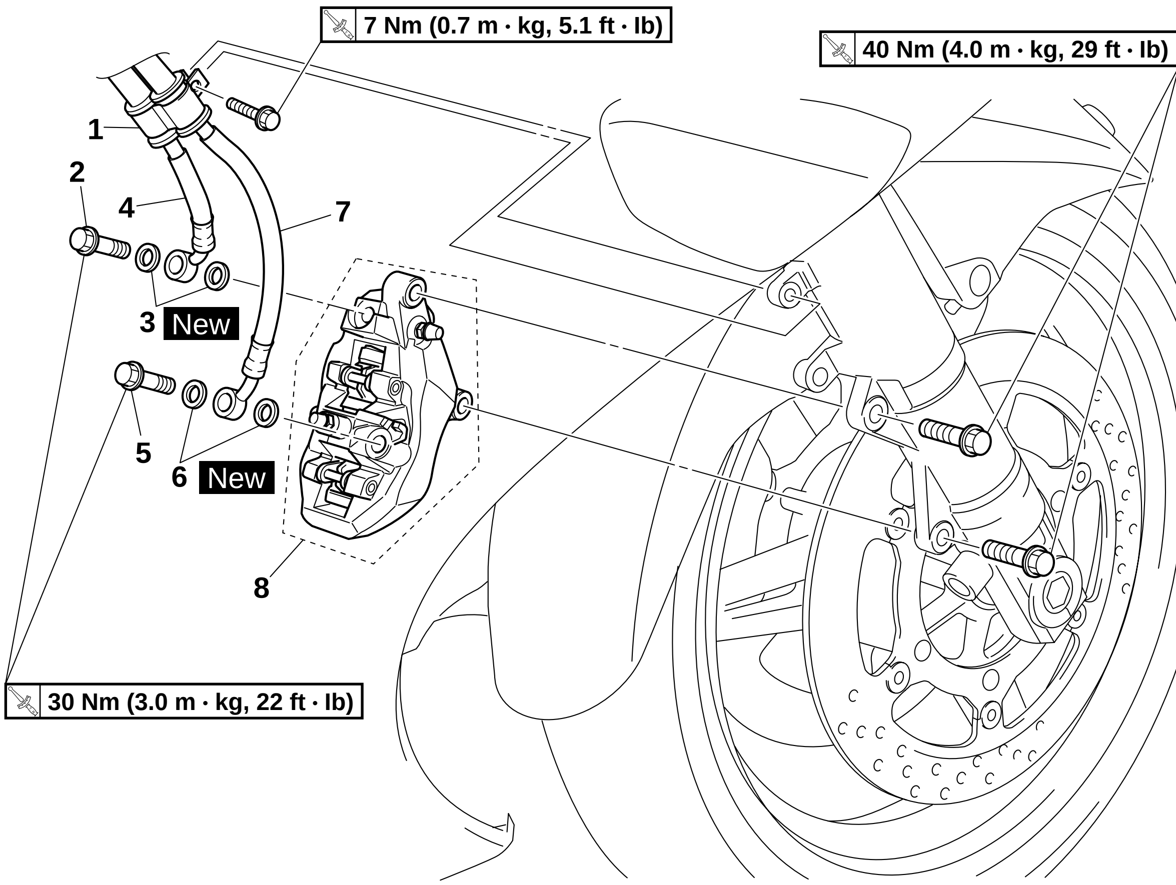
Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-31.
1	Brake master cylinder reservoir cap	1	
2	Brake master cylinder reservoir diaphragm hold-er	1	
3	Brake master cylinder reservoir diaphragm	1	
4	Brake lever	1	
5	Front brake light switch connector	2	Disconnect.
6	Brake hose union bolt	1	
7	Copper washer	2	
8	Brake hose (front brake master cylinder to brake pipe/lower joint assembly)	1	
9	Front brake master cylinder holder	1	
10	Front brake master cylinder	1	
11	Front brake light switch	1	
			For installation, reverse the removal proce-dure.

Disassembling the front brake master cylinder



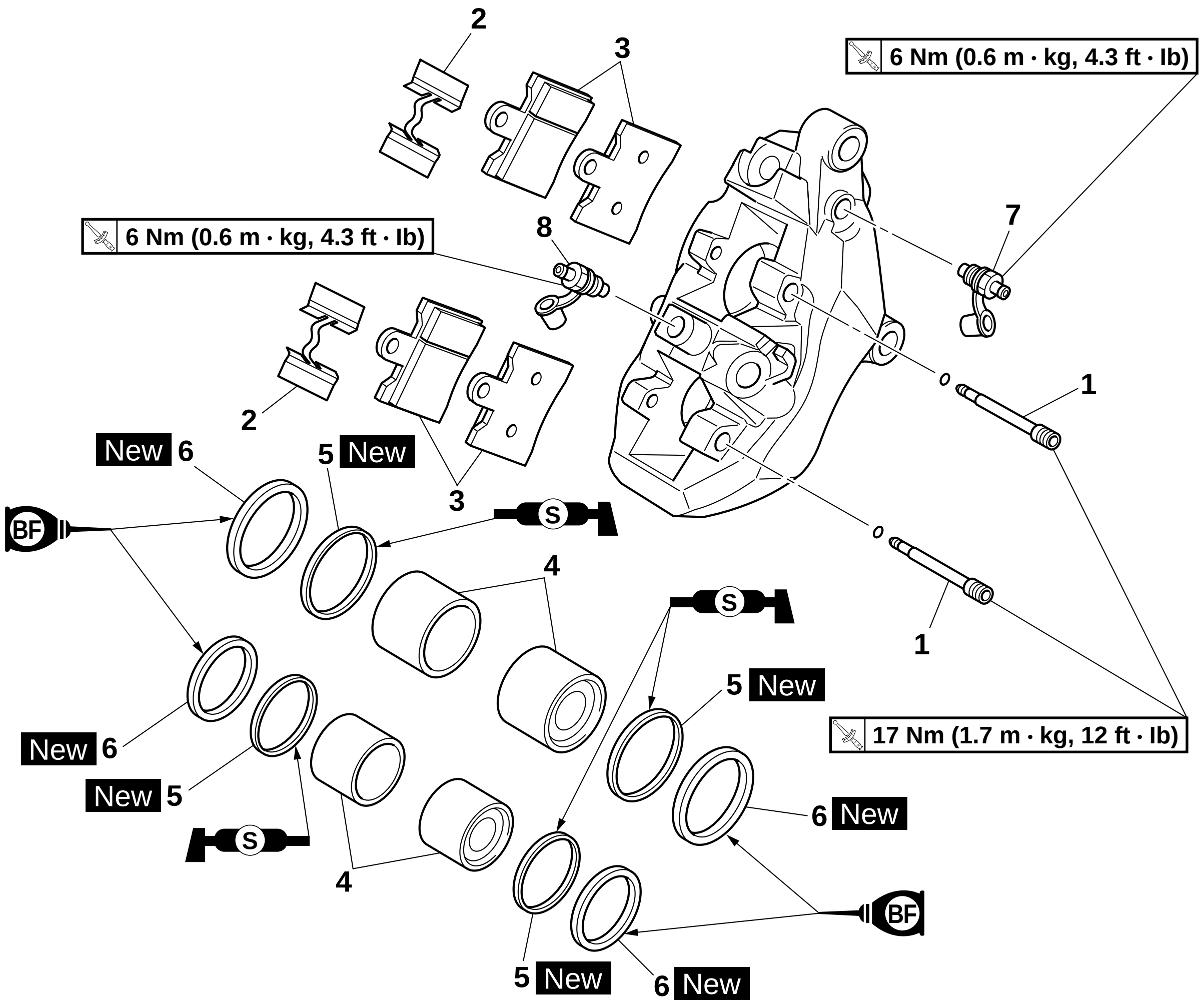
Order	Job/Parts to remove	Q'ty	Remarks
1	Brake master cylinder push rod	1	
2	Dust boot	1	
3	Circlip	1	
4	Brake master cylinder kit	1	
5	Brake master cylinder body	1	
			For assembly, reverse the disassembly procedure.

Removing the front brake calipers



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front brake calipers.
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-31.
1	Brake hose holder	1	
2	Brake hose union bolt	1	
3	Copper washer	2	
4	Brake hose (brake pipe/upper joint assembly to right front brake caliper)	1	
5	Brake hose union bolt (unified brake system)	1	Right side only.
6	Copper washer	2	Right side only.
7	Brake hose (metering valve to right front brake caliper)	1	Right side only.
8	Front brake caliper	1	
			For installation, reverse the removal procedure.

Disassembling the front brake calipers



Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front brake calipers.
1	Brake pad bolt	2	
2	Brake pad spring	2	
3	Front brake pad	4	
4	Brake caliper piston	4	
5	Brake caliper piston dust seal	4	
6	Brake caliper piston seal	4	
7	Bleed screw	1	
8	Bleed screw	1	Right side only.
			For assembly, reverse the disassembly procedure.

EAS22220

INTRODUCTION

EWA14100

WARNING

Disc brake components rarely require disassembly. Therefore, always follow these preventive measures:

- **Never disassemble brake components unless absolutely necessary.**
- **If any connection on the hydraulic brake system is disconnected, the entire brake system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.**
- **Never use solvents on internal brake components.**
- **Use only clean or new brake fluid for cleaning brake components.**
- **Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.**
- **Avoid brake fluid coming into contact with the eyes as it can cause serious injury.**
- **FIRST AID FOR BRAKE FLUID ENTERING THE EYES:**
- **Flush with water for 15 minutes and get immediate medical attention.**

EAS22240

CHECKING THE FRONT BRAKE DISCS

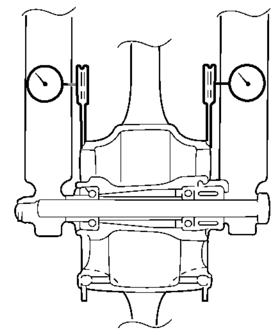
The following procedure applies to both brake discs.

1. Remove:
   - Front wheel
     Refer to “FRONT WHEEL” on page 4-17.
2. Check:
   - Brake disc
     Damage/galling → Replace.
3. Measure:
   - Brake disc deflection
     Out of specification → Correct the brake disc deflection or replace the brake disc.

Brake disc deflection limit
0.10 mm (0.0039 in)

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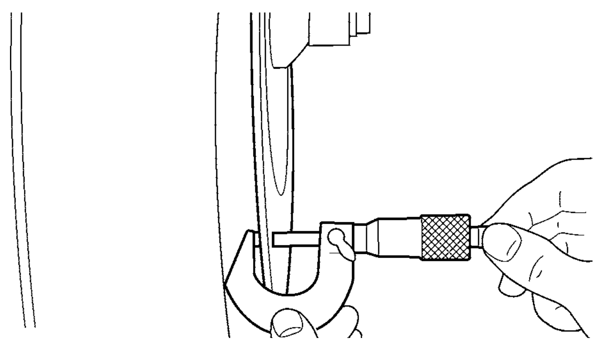
a. Place the vehicle on a suitable stand so that the front wheel is elevated.
b. Before measuring the front brake disc deflection, turn the handlebar to the left or right to ensure that the front wheel is stationary.
c. Remove the brake caliper.
d. Hold the dial gauge at a right angle against the brake disc surface.
e. Measure the deflection 1.5 mm (0.06 in) below the edge of the brake disc.



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4. Measure:
   - Brake disc thickness
     Measure the brake disc thickness at a few different locations.
     Out of specification → Replace.

Brake disc thickness limit
4.0 mm (0.16 in)



5. Adjust:
   - Brake disc deflection

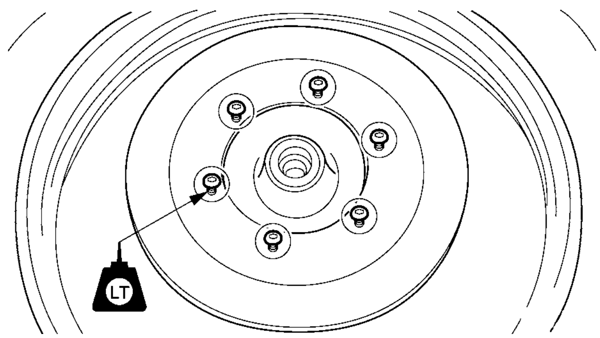
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a. Remove the brake disc.
b. Rotate the brake disc by one bolt hole.
c. Install the brake disc.

Brake disc bolt
18 Nm (1.8 m·kg, 13 ft·lb)
LOCTITE®

TIP

Tighten the brake disc bolts in stages and in a crisscross pattern.



d. Measure the brake disc deflection.
e. If out of specification, repeat the adjustment steps until the brake disc deflection is within specification.
f. If the brake disc deflection cannot be brought within specification, replace the brake disc.

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6. Install:
   - Front wheel
     Refer to "FRONT WHEEL" on page 4-17.

EAS22260

REPLACING THE FRONT BRAKE PADS

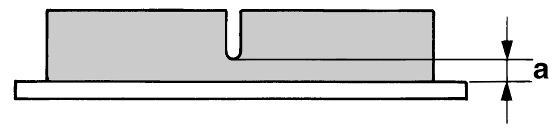
The following procedure applies to both brake calipers.

TIP

When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.

1. Measure:
   - Brake pad wear limit "a"
     Out of specification → Replace the brake pads as a set.

Brake pad lining thickness (inner)
5.5 mm (0.22 in)
Limit
0.5 mm (0.02 in)
Brake pad lining thickness (outer)
5.5 mm (0.22 in)
Limit
0.5 mm (0.02 in)



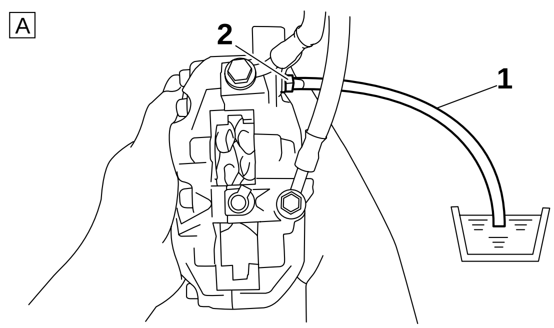
2. Install:
   - Brake pads
   - Brake pad spring

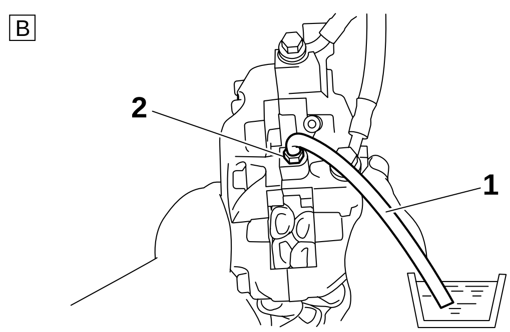
TIP

Always install new brake pads and a new brake pad spring as a set.

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a. Connect a clear plastic hose "1" tightly to the bleed screw "2". Put the other end of the hose into an open container.





A. Front brake
B. Unified brake system

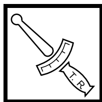
b. Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.
c. Tighten the bleed screw.

Bleed screw
6 Nm (0.6 m·kg, 4.3 ft·lb)

d. Install new brake pads and a new brake pad spring.

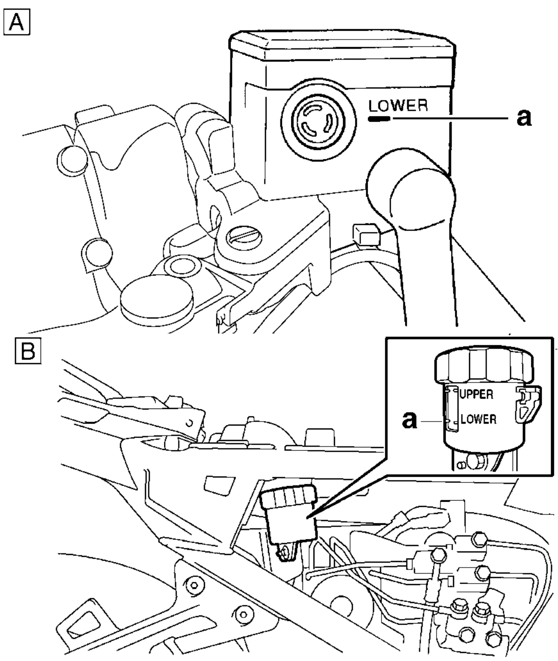
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3. Install:
   - Brake pad bolts
   - Brake caliper



Brake pad bolt
17 Nm (1.7 m·kg, 12 ft·lb)
Brake caliper bolt
40 Nm (4.0 m·kg, 29 ft·lb)

4. Check:
   - Brake fluid level
     Below the minimum level mark “a” → Add the recommended brake fluid to the proper level.
     Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-29.



A. Front brake
B. Unified brake system

5. Check:
   - Brake lever and brake pedal operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-31.

EAS22300

REMOVING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

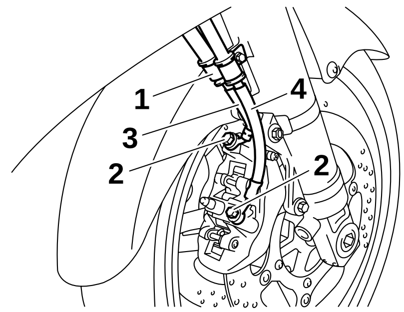
TIP

Before removing the brake caliper, drain the brake fluid from the entire brake system.

1. Remove:
   - Brake hose holder “1”
   - Brake hose union bolts “2”
   - Copper washers
   - Brake hose (brake pipe/upper joint assembly to right front brake caliper) “3”
   - Brake hose (metering valve to right front brake caliper) “4”

TIP

Put the end of the brake hoses into a container and pump out the brake fluid carefully.

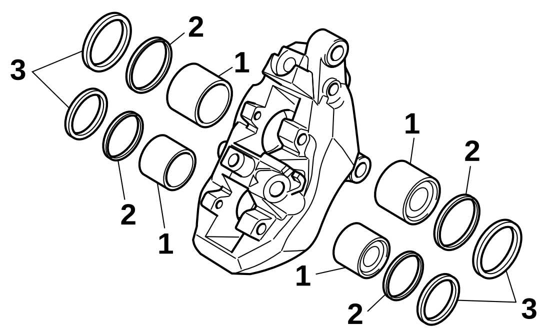


EAS22360

DISASSEMBLING THE FRONT BRAKE CALIPERS

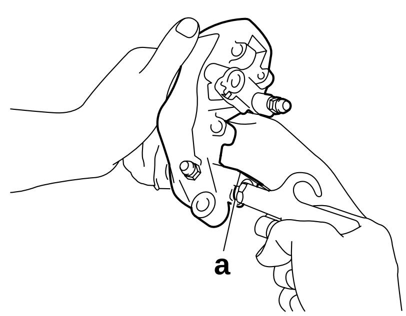
The following procedure applies to both of the brake calipers.

1. Remove:
   - Brake caliper pistons “1”
   - Brake caliper piston dust seals “2”
   - Brake caliper piston seals “3”



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a. Blow compressed air into the brake hose joint opening “a” to force out the pistons from the brake caliper.



EWA13560

WARNING

- **Cover the brake caliper pistons with a rag. Be careful not to get injured when the pistons are expelled from the brake caliper.**
- **Never try to pry out the brake caliper pistons.**

b. Remove the brake caliper piston dust seals and brake caliper piston seals.

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EAS22390

CHECKING THE FRONT BRAKE CALIPERS

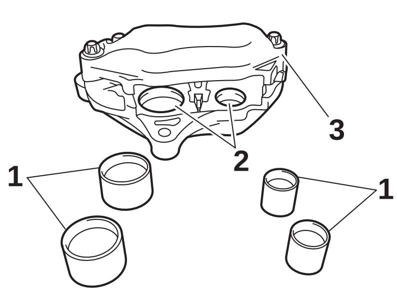
Recommended brake component replacement schedule	
Brake pads	If necessary
Piston dust seals	Every two years
Piston seals	Every two years
Brake hoses	Every four years
Brake fluid	Every two years and whenever the brake is disassembled

1. Check:
   - Brake caliper pistons “1”
     Rust/scratches/wear → Replace the brake caliper pistons.
   - Brake caliper cylinders “2”
     Scratches/wear → Replace the brake caliper assembly.
   - Brake caliper body “3”
     Cracks/damage → Replace the brake caliper assembly.
   - Brake fluid delivery passages (brake caliper body)
     Obstruction → Blow out with compressed air.

EWA3P6D001

WARNING

Whenever a brake caliper is disassembled, replace the brake caliper piston dust seals and brake caliper piston seals.



EAS22410

ASSEMBLING THE FRONT BRAKE CALIPERS

EWA3P6D002

WARNING

- **Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.**
- **Never use solvents on internal brake components as they will cause the brake caliper piston dust seals and brake caliper piston seals to swell and distort.**
- **Whenever a brake caliper is disassembled, replace the brake caliper piston dust seals and brake caliper piston seals.**

Recommended fluid
DOT 4

EAS22440

INSTALLING THE FRONT BRAKE CALIPERS

The following procedure applies to both of the brake calipers.

1. Install:
   - Front brake caliper “1” (temporarily)
   - Copper washers New
   - Brake hose (brake pipe/upper joint assembly to right front brake caliper) “2”
   - Brake hose (metering valve to right front brake caliper) “3”
   - Brake hose union bolts “4”

Brake hose union bolt
30 Nm (3.0 m·kg, 22 ft·lb)

EW3P66002

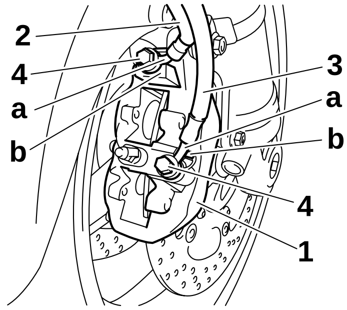
WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING (FJR13A)” on page 2-45 and “CABLE ROUTING (FJR13AE)” on page 2-65.

ECA14170

NOTICE

When installing the brake hose onto the brake caliper “1”, make sure the brake pipe “a” touches the projection “b” on the brake caliper.



2. Remove:
   - Brake caliper
3. Install:
   - Brake pads
   - Brake pad springs
   - Brake pad bolts
   - Brake caliper
   - Brake hose holder

   Refer to "REPLACING THE FRONT BRAKE PADS" on page 4-38.

Brake pad bolt
17 Nm (1.7 m·kg, 12 ft·lb)
Brake caliper bolt
40 Nm (4.0 m·kg, 29 ft·lb)
Brake hose holder bolt
7 Nm (0.7 m·kg, 5.1 ft·lb)

4. Fill:
   - Brake master cylinder reservoir
   - Brake fluid reservoir

   (with the specified amount of the recommended brake fluid)

Recommended fluid
DOT 4

EW3P61008

WARNING

- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.**
- **When refilling, be careful that water does not enter the brake master cylinder reservoir and brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.**

ECA13540

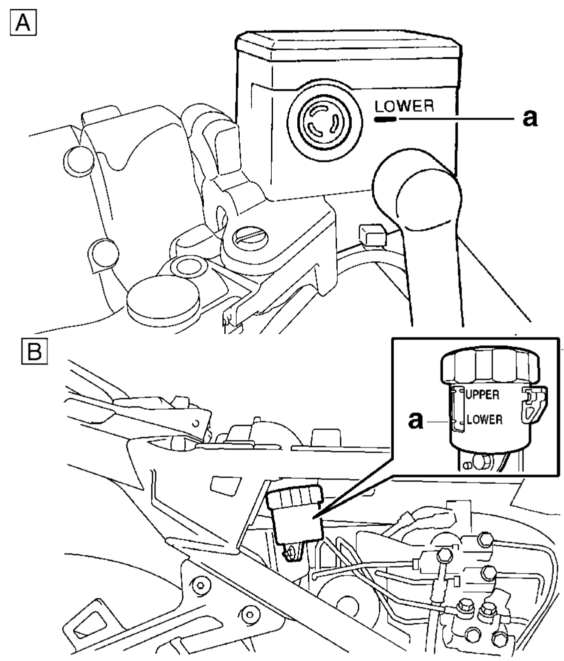
NOTICE

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

5. Bleed:
   - Brake system

   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-31.
6. Check:
   - Brake fluid level

   Below the minimum level mark "a" → Add the recommended brake fluid to the proper level.
   Refer to "CHECKING THE BRAKE FLUID LEVEL" on page 3-29.



A. Front brake
B. Unified brake system

7. Check:
   - Brake lever and brake pedal operation

   Soft or spongy feeling → Bleed the brake system.
   Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-31.

EAS22490

REMOVING THE FRONT BRAKE MASTER CYLINDER

TIP

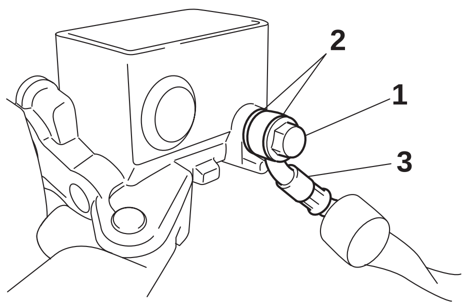
Before removing the front brake master cylinder, drain the brake fluid from the entire brake system.

1. Remove:
   - Brake hose union bolt "1"

- Copper washers “2”
- Brake hose (front brake master cylinder to brake pipe/lower joint assembly) “3”

TIP

To collect any remaining brake fluid, place a container under the master cylinder and the end of the brake hose.



EAS22500

CHECKING THE FRONT BRAKE MASTER CYLINDER

1. Check:
   - Brake master cylinder
     Damage/scratches/wear → Replace.
   - Brake fluid delivery passages
     (brake master cylinder body)
     Obstruction → Blow out with compressed air.
2. Check:
   - Brake master cylinder kit
     Damage/scratches/wear → Replace.
3. Check:
   - Brake master cylinder reservoir
     Cracks/damage → Replace.
   - Brake master cylinder reservoir diaphragm
     Damage/wear → Replace.
4. Check:
   - Brake hose
     Cracks/damage/wear → Replace.

EAS22520

ASSEMBLING THE FRONT BRAKE MASTER CYLINDER

EWA13520

⚠ WARNING

- **Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.**
- **Never use solvents on internal brake components.**

Recommended fluid
DOT 4

EAS22530

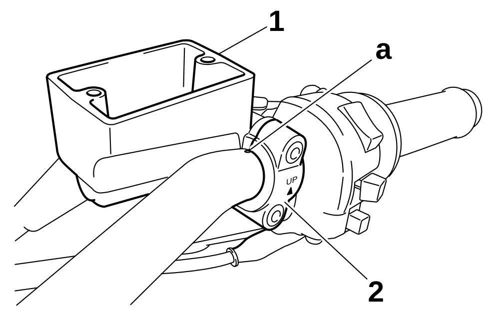
INSTALLING THE FRONT BRAKE MASTER CYLINDER

1. Install:
   - Brake master cylinder “1”
   - Brake master cylinder holder “2”

Brake master cylinder holder bolt
10 Nm (1.0 m·kg, 7.2 ft·lb)

TIP

- Install the brake master cylinder holder with the “UP” mark facing up.
- Align the mating surfaces of the brake master cylinder holder with the punch mark “a” on the right handlebar.
- First, tighten the upper bolt, then the lower bolt.



2. Install:
   - Copper washers **New**
   - Brake hose (front brake master cylinder to brake pipe/lower joint assembly)
   - Brake hose union bolt

Brake hose union bolt
30 Nm (3.0 m·kg, 22 ft·lb)

EW3P66002

⚠ WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING (FJR13A)” on page 2-45 and “CABLE ROUTING (FJR13AE)” on page 2-65.

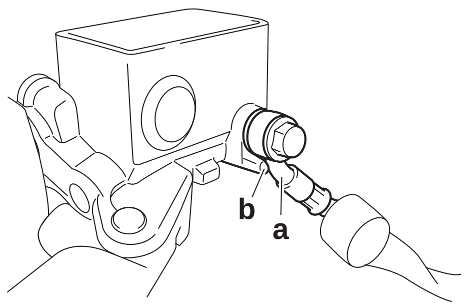
EC3P61025

NOTICE

When installing the brake hose onto the brake master cylinder, make sure the brake pipe “a” touches the projection “b” on the brake master cylinder.

TIP

Turn the handlebar to the left and right to make sure the brake hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.



3. Fill:
   - Brake master cylinder reservoir
   - Brake fluid reservoir
     (with the specified amount of the recommended brake fluid)



Recommended fluid
DOT 4

EW3P61008

WARNING

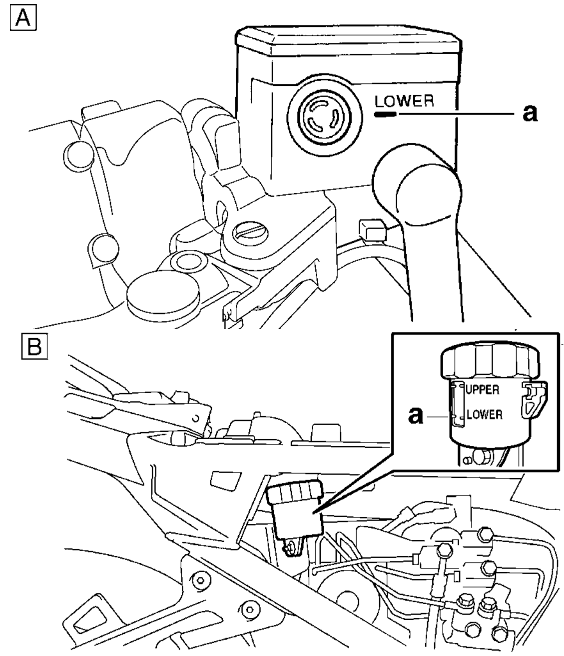
- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.**
- **When refilling, be careful that water does not enter the brake master cylinder reservoir and brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.**

ECA13540

NOTICE

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

4. Bleed:
   - Brake system
     Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-31.
5. Check:
   - Brake fluid level
     Below the minimum level mark “a” → Add the recommended brake fluid to the proper level.
     Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-29.



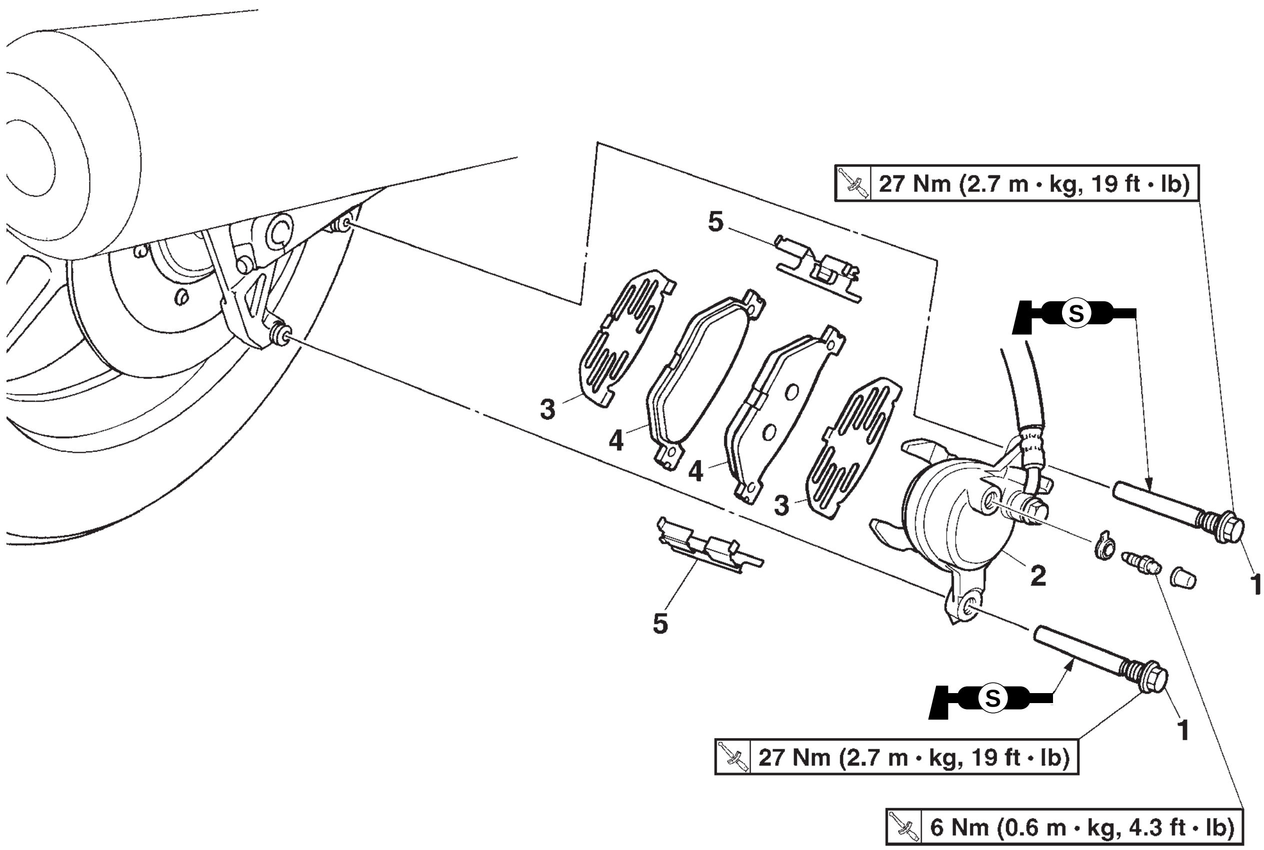
A. Front brake
B. Unified brake system

6. Check:
   - Brake lever and brake pedal operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-31.

EAS22550

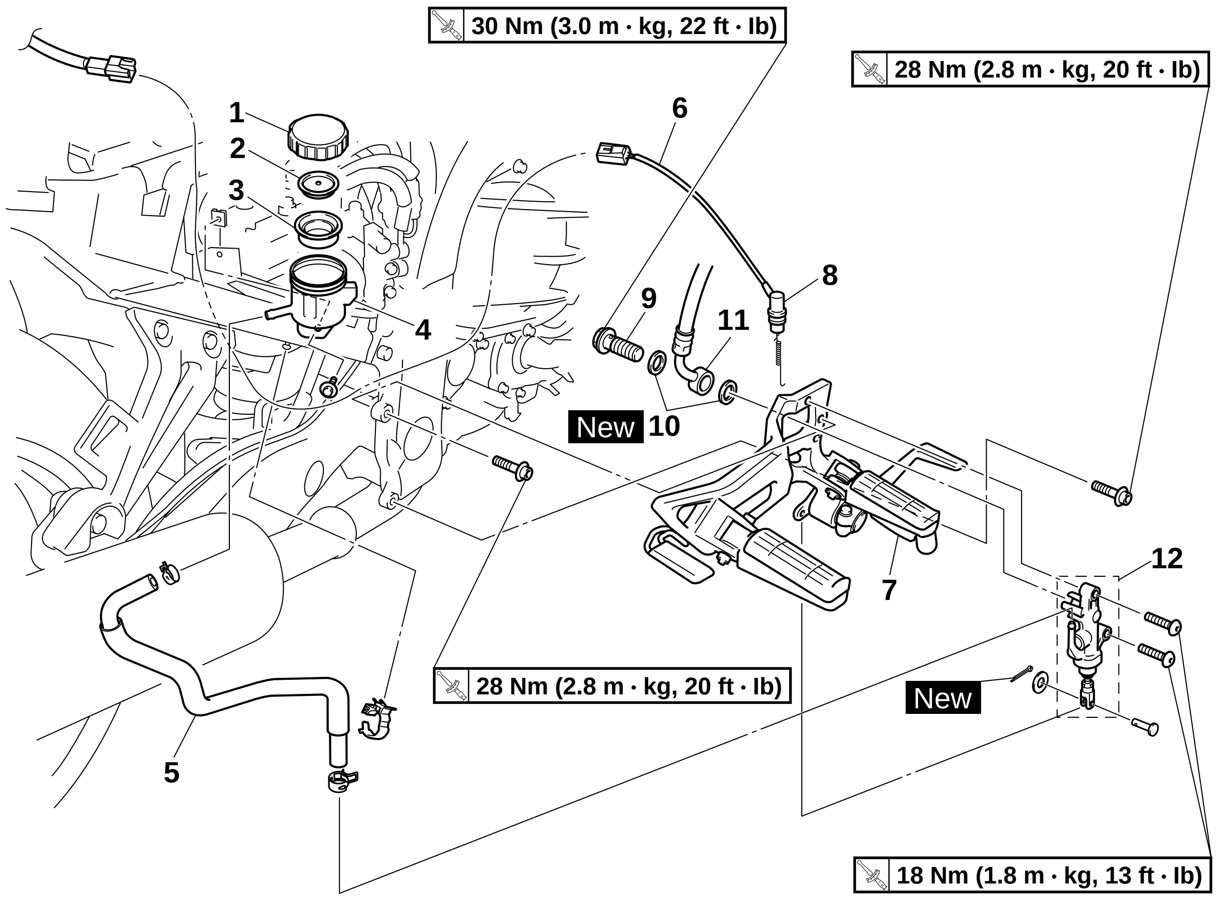
REAR BRAKE

Removing the rear brake pads



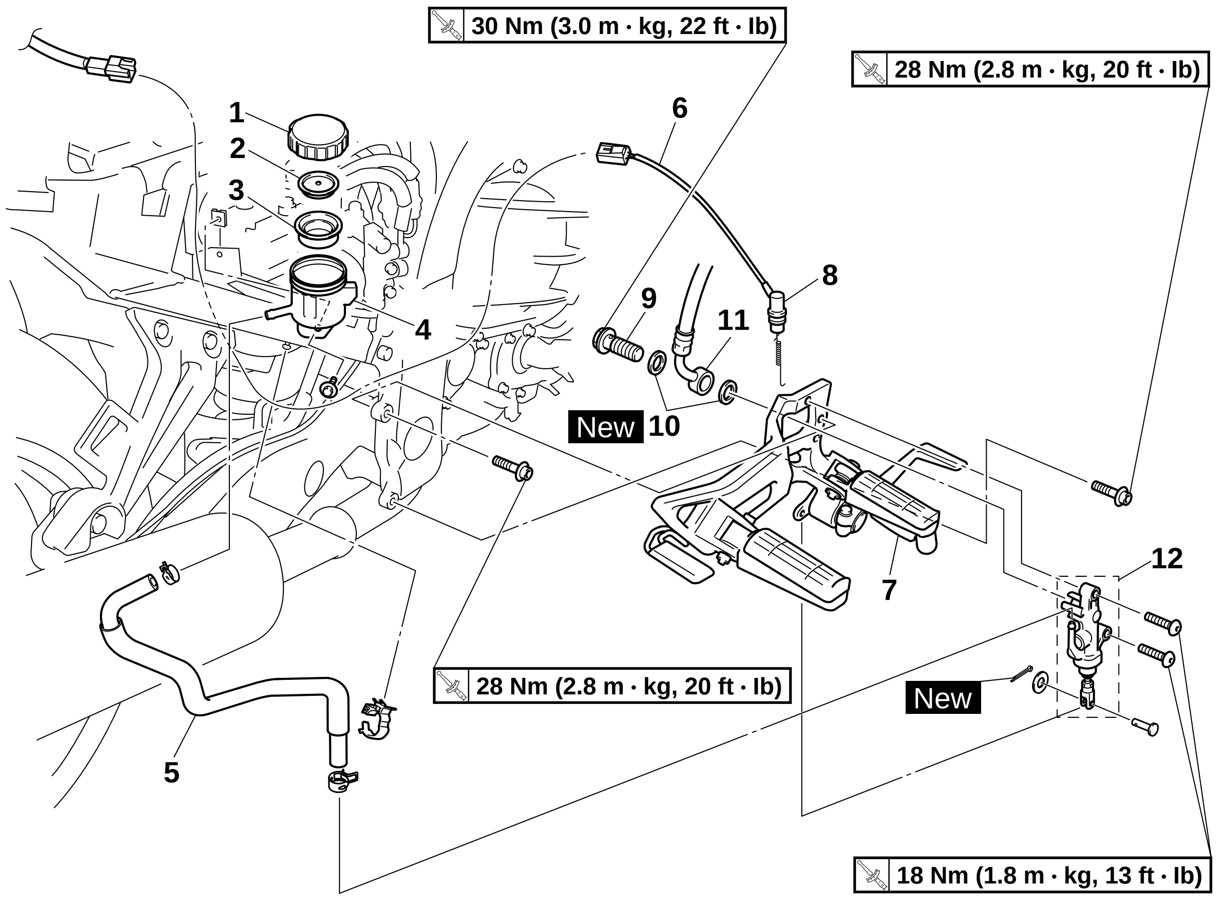
Order	Job/Parts to remove	Q'ty	Remarks
1	Rear brake caliper bolt	2	
2	Rear brake caliper	1	
3	Brake pad shim	2	
4	Rear brake pad	2	
5	Brake pad spring	2	
			For installation, reverse the removal procedure.

Removing the rear brake master cylinder



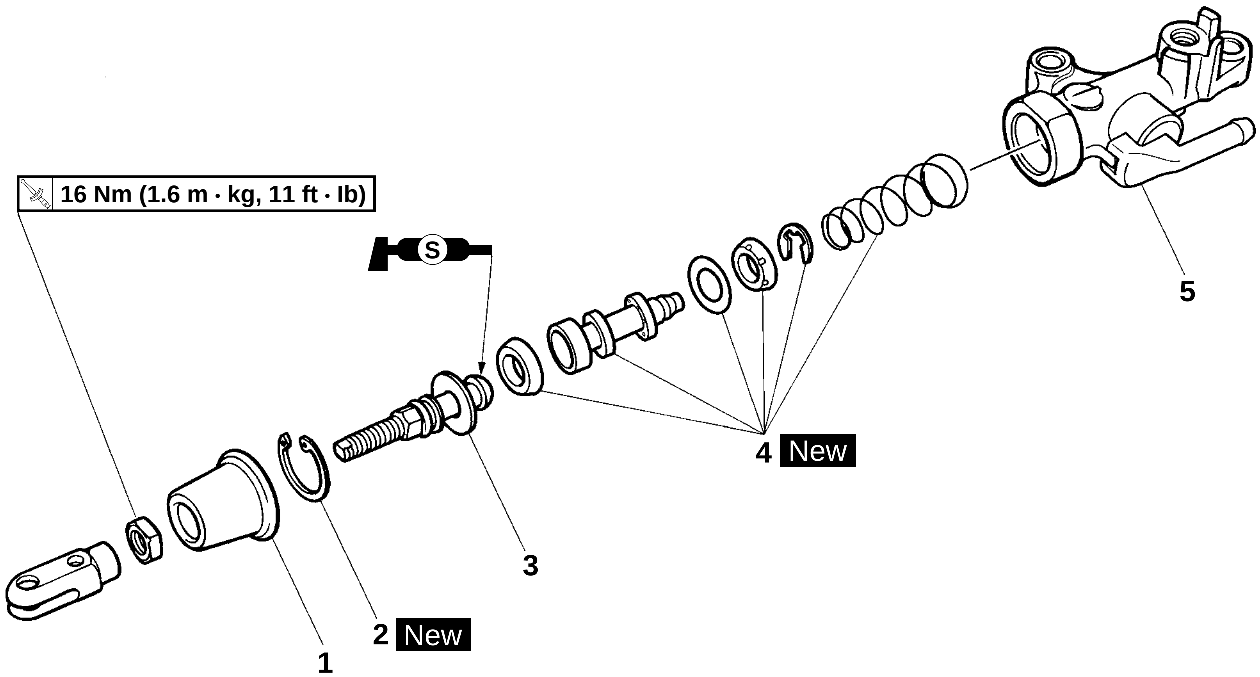
Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-31.
	Right side cover/Storage compartment		Refer to "GENERAL CHASSIS" on page 4-1.
1	Brake fluid reservoir cap	1	
2	Brake fluid reservoir diaphragm holder	1	
3	Brake fluid reservoir diaphragm	1	
4	Brake fluid reservoir	1	
5	Brake fluid reservoir hose	1	
6	Rear brake light switch coupler	1	Disconnect.
7	Right footrest assembly	1	
8	Rear brake light switch	1	
9	Brake hose union bolt	1	
10	Copper washer	2	
11	Brake hose (rear brake master cylinder to brake pipe/middle joint assembly)	1	Disconnect.

Removing the rear brake master cylinder



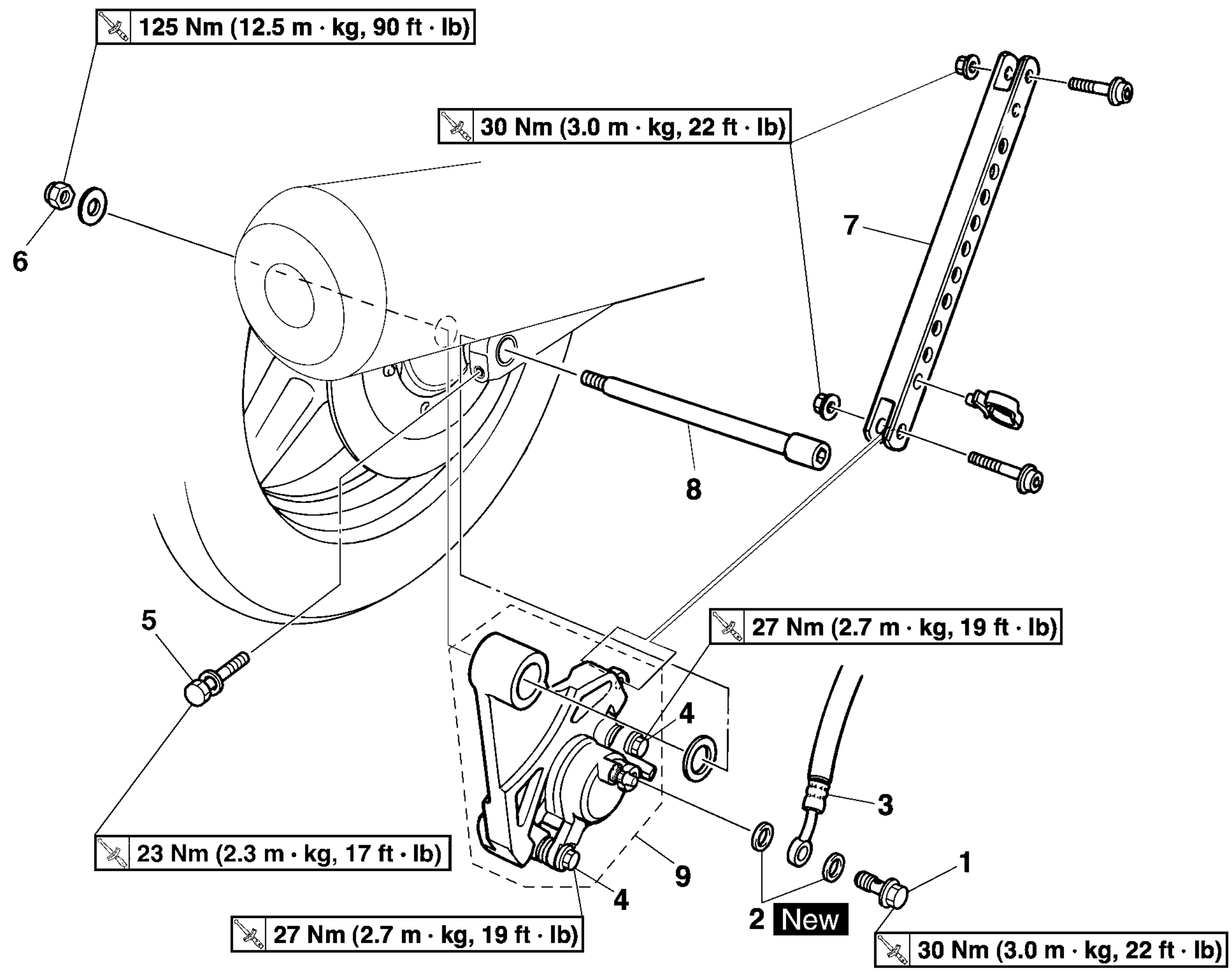
Order	Job/Parts to remove	Q'ty	Remarks
12	Rear brake master cylinder	1	
			For installation, reverse the removal procedure.

Disassembling the rear brake master cylinder



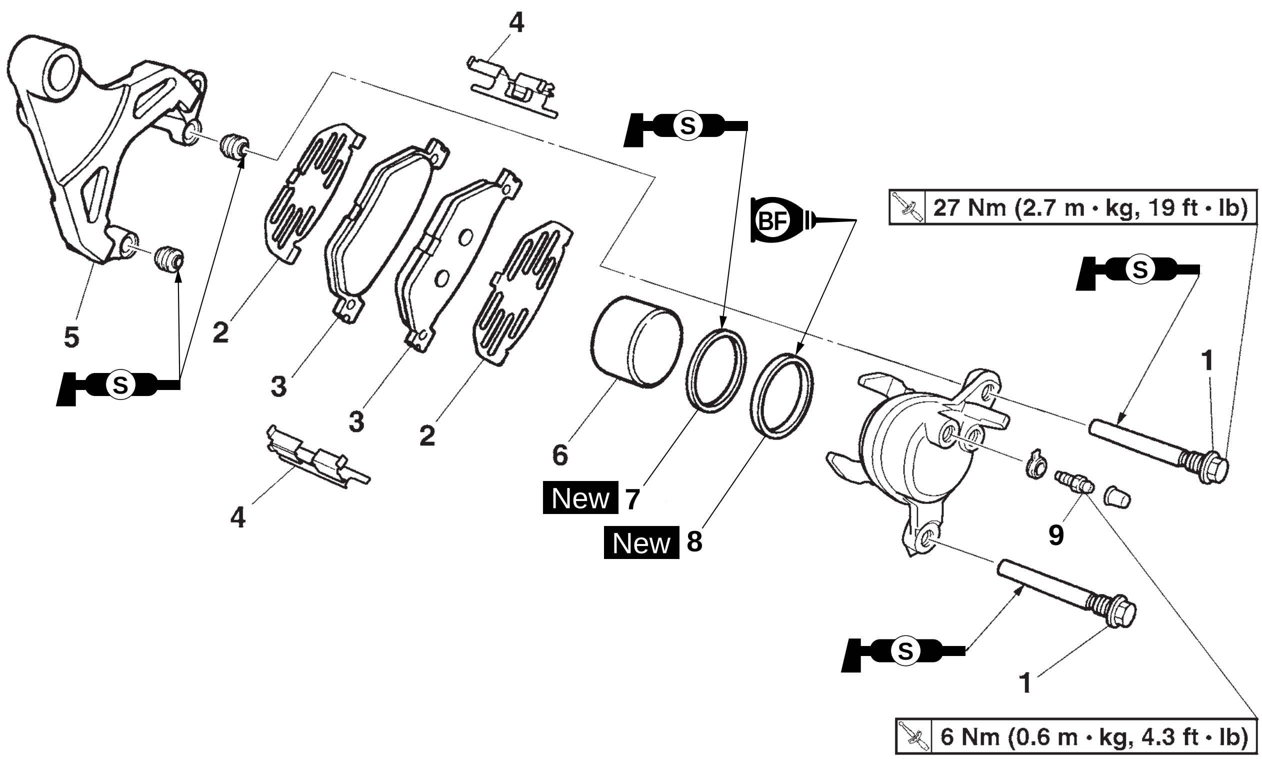
Order	Job/Parts to remove	Q'ty	Remarks
1	Dust boot	1	
2	Circlip	1	
3	Brake master cylinder push rod	1	
4	Brake master cylinder kit	1	
5	Brake master cylinder body	1	
			For assembly, reverse the disassembly procedure.

Removing the rear brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-31.
1	Brake hose union bolt	1	
2	Copper washer	2	
3	Brake hose (proportioning valve to rear brake caliper)	1	
4	Rear brake caliper bolt	2	Loosen.
5	Rear wheel axle pinch bolt	1	Loosen.
6	Rear wheel axle nut	1	
7	Brake torque rod	1	
8	Rear wheel axle	1	
9	Rear brake caliper assembly	1	
			For installation, reverse the removal procedure.

Disassembling the rear brake caliper



Order	Job/Parts to remove	Q'ty	Remarks
1	Rear brake caliper bolt	2	
2	Brake pad shim	2	
3	Rear brake pad	2	
4	Brake pad spring	2	
5	Rear brake caliper bracket	1	
6	Brake caliper piston	1	
7	Brake caliper piston dust seal	1	
8	Brake caliper piston seal	1	
9	Bleed screw	1	
			For assembly, reverse the disassembly procedure.

EAS22560

INTRODUCTION

EWA14100

WARNING

Disc brake components rarely require disassembly. Therefore, always follow these preventive measures:
- **Never disassemble brake components unless absolutely necessary.**
- **If any connection on the hydraulic brake system is disconnected, the entire brake system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.**
- **Never use solvents on internal brake components.**
- **Use only clean or new brake fluid for cleaning brake components.**
- **Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.**
- **Avoid brake fluid coming into contact with the eyes as it can cause serious injury.**
- **FIRST AID FOR BRAKE FLUID ENTERING THE EYES:**
- **Flush with water for 15 minutes and get immediate medical attention.**

EAS22570

CHECKING THE REAR BRAKE DISC

1. Remove:
   - Rear wheel
     Refer to “REAR WHEEL” on page 4-25.
2. Check:
   - Brake disc
     Damage/galling → Replace.
3. Measure:
   - Brake disc deflection
     Out of specification → Correct the brake disc deflection or replace the brake disc.
     Refer to “CHECKING THE FRONT BRAKE DISCS” on page 4-37.

Brake disc deflection limit
0.15 mm (0.0059 in)

4. Measure:
   - Brake disc thickness
     Measure the brake disc thickness at a few different locations.
     Out of specification → Replace.
     Refer to “CHECKING THE FRONT BRAKE DISCS” on page 4-37.

Brake disc thickness limit
4.5 mm (0.18 in)

5. Adjust:
   - Brake disc deflection
     Refer to “CHECKING THE FRONT BRAKE DISCS” on page 4-37.

Brake disc bolt
18 Nm (1.8 m·kg, 13 ft·lb)
LOCTITE®

6. Install:
   - Rear wheel
     Refer to “REAR WHEEL” on page 4-25.

EAS22580

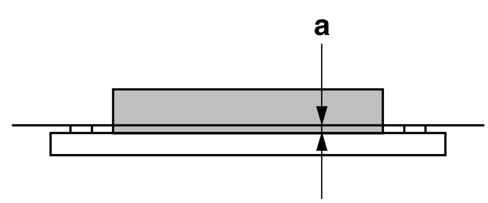
REPLACING THE REAR BRAKE PADS

TIP

When replacing the brake pads, it is not necessary to disconnect the brake hose or disassemble the brake caliper.

1. Measure:
   - Brake pad wear limit “a”
     Out of specification → Replace the brake pads as a set.

Brake pad lining thickness (inner)
6.3 mm (0.25 in)
Limit
0.8 mm (0.03 in)
Brake pad lining thickness (outer)
6.3 mm (0.25 in)
Limit
0.8 mm (0.03 in)



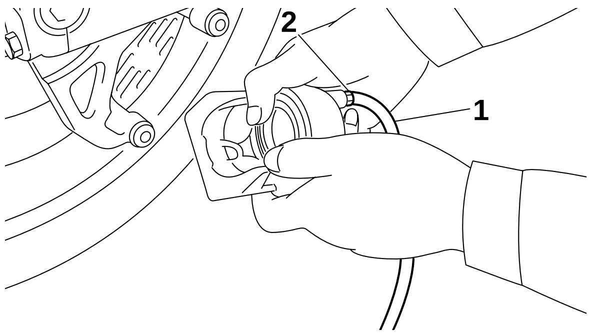
2. Install:
   - Brake pad springs
   - Brake pad shims
     (onto the brake pads)
   - Brake pads

TIP

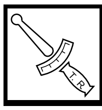
Always install new brake pads, brake pad shims, and brake pad springs as a set.

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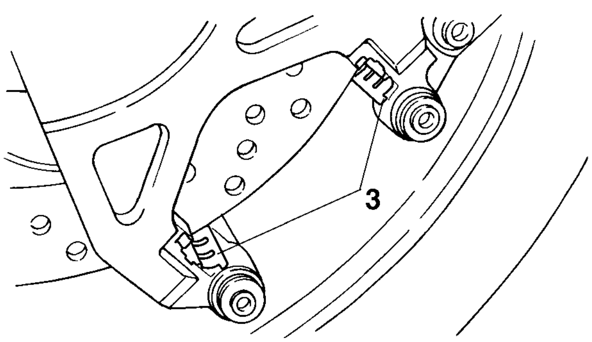
a. Connect a clear plastic hose “1” tightly to the bleed screw “2”. Put the other end of the hose into an open container.
b. Loosen the bleed screw and push the brake caliper pistons into the brake caliper with your finger.



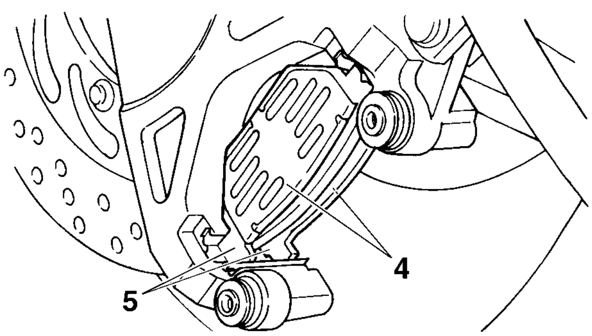
c. Tighten the bleed screw.

	**Bleed screw** **6 Nm (0.6 m·kg, 4.3 ft·lb)**

d. Install new brake pad springs “3”.



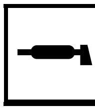
e. Install a new brake pad shim “4” onto each new brake pad “5”.



f. Install new brake pads.

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3. Lubricate:
   • Rear brake caliper bolt

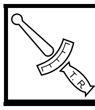
	**Recommended lubricant** **Silicone grease**

ECA3P6D017

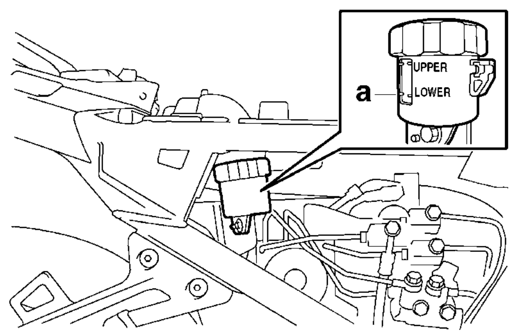
NOTICE

- **Do not allow grease to contact the brake pads.**
- **Remove any excess grease.**

4. Install:
   • Rear brake caliper

	**Rear brake caliper bolt** **27 Nm (2.7 m·kg, 19 ft·lb)**

5. Check:
   • Brake fluid level
   Below the minimum level mark “a” → Add the recommended brake fluid to the proper level.
   Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-29.



6. Check:
   • Brake pedal operation
   Soft or spongy feeling → Bleed the brake system.
   Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-31.

EAS22590

REMOVING THE REAR BRAKE CALIPER

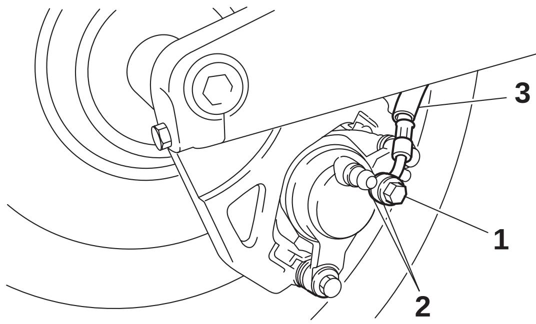
TIP

Before disassembling the brake caliper, drain the brake fluid from the entire brake system.

1. Remove:
   • Brake hose union bolt “1”
   • Copper washers “2”
   • Brake hose (proportioning valve to rear brake caliper) “3”

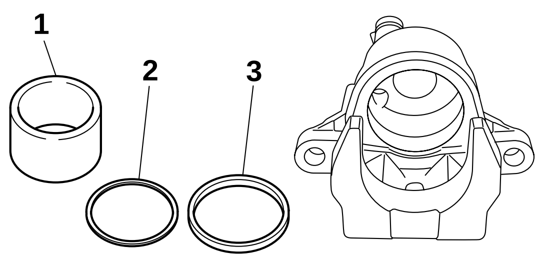
TIP

Put the end of the brake hose into a container and pump out the brake fluid carefully.



EAS22600
DISASSEMBLING THE REAR BRAKE CALIPER

1. Remove:
   - Brake caliper piston “1”
   - Brake caliper piston dust seal “2”
   - Brake caliper piston seal “3”

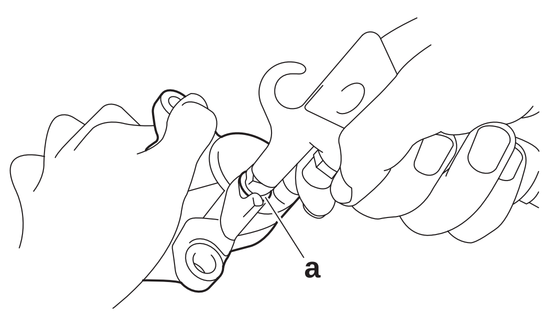


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a. Blow compressed air into the brake hose joint opening “a” to force out the piston from the brake caliper.

EWA13550
⚠ WARNING

- **Cover the brake caliper piston with a rag. Be careful not to get injured when the piston is expelled from the brake caliper.**
- **Never try to pry out the brake caliper piston.**



b. Remove the brake caliper piston dust seal and brake caliper piston seal.

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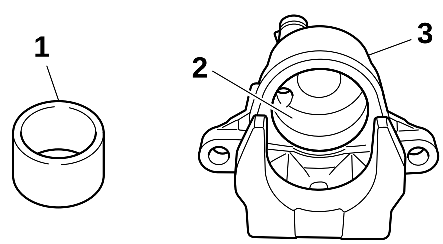
EAS22640
CHECKING THE REAR BRAKE CALIPER

Recommended brake component replacement schedule	
Brake pads	If necessary
Piston dust seal	Every two years
Piston seal	Every two years
Brake hoses	Every four years
Brake fluid	Every two years and whenever the brake is disassembled

1. Check:
   - Brake caliper piston “1”
     Rust/scratches/wear → Replace the brake caliper piston.
   - Brake caliper cylinder “2”
     Scratches/wear → Replace the brake caliper assembly.
   - Brake caliper body “3”
     Cracks/damage → Replace the brake caliper assembly.
   - Brake fluid delivery passage (brake caliper body)
     Obstruction → Blow out with compressed air.

EWA3P6D003
⚠ WARNING

Whenever a brake caliper is disassembled, replace the brake caliper piston dust seal and brake caliper piston seal.



2. Check:
   - Brake caliper bracket
     Cracks/damage → Replace.

EAS22650
ASSEMBLING THE REAR BRAKE CALIPER

EWA3P6D004
⚠ WARNING

- **Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.**

- **Never use solvents on internal brake components as they will cause the brake caliper piston dust seal and brake caliper piston seal to swell and distort.**
- **Whenever a brake caliper is disassembled, replace the brake caliper piston dust seal and brake caliper piston seal.**

	Recommended fluid **DOT 4**

EAS22670

INSTALLING THE REAR BRAKE CALIPER

1. Install:
   - Rear brake caliper assembly (temporarily)
   - Rear wheel axle
   - Brake torque rod
   - Rear wheel axle nut

TIP

- Do not install the brake pads, brake pad shims, and brake pad springs.
- Align the slot "a" of the rear wheel sensor housing "1" with the projection "b" of the rear brake caliper bracket "2", and then assemble them.
- After assembling the rear wheel sensor housing and the rear brake caliper bracket, make sure that the projection "c" on the housing is aligned with the projection "d" on the bracket.

ECA14470

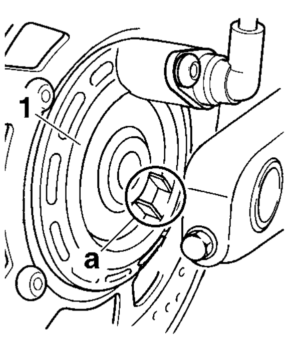
NOTICE

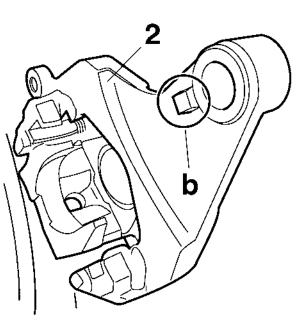
Make sure there are no foreign materials in the wheel hub. Foreign materials cause damage to the inner sensor rotor and wheel sensor.

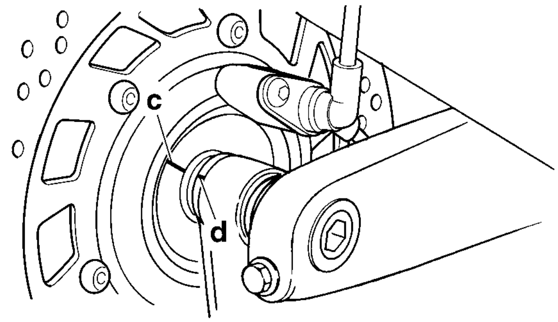
EWA13500

WARNING

Make sure the brake hose is routed properly.







2. Tighten:
   - Brake torque rod nuts
   - Rear wheel axle nut
   - Rear wheel axle pinch bolt

	Brake torque rod nut **30 Nm (3.0 m·kg, 22 ft·lb)** **Rear wheel axle nut** **125 Nm (12.5 m·kg, 90 ft·lb)** **Rear wheel axle pinch bolt** **23 Nm (2.3 m·kg, 17 ft·lb)**

3. Install:
   - Copper washers New
   - Brake hose (proportioning valve to rear brake caliper) "1"
   - Brake hose union bolt "2"

	Brake hose union bolt **30 Nm (3.0 m·kg, 22 ft·lb)**

EW3P66002

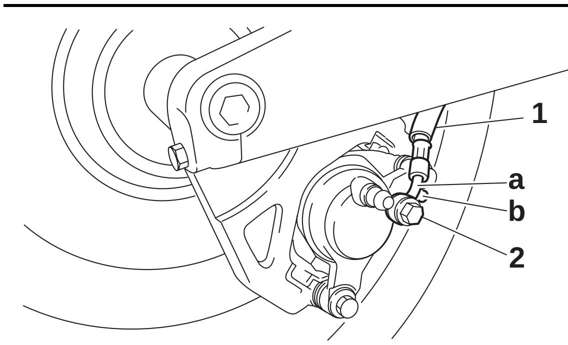
WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING (FJR13A)" on page 2-45 and "CABLE ROUTING (FJR13AE)" on page 2-65.

EC3P61044

NOTICE

When installing the brake hose onto the brake caliper, make sure the brake pipe "a" touches the projection "b" on the brake caliper.



4. Remove:
   - Rear brake caliper bolts
   - Rear brake caliper
5. Install:
   - Brake pad springs
   - Rear brake pads
   - Brake pad shims
   - Rear brake caliper bolts
   - Rear brake caliper

   Refer to “REPLACING THE REAR BRAKE PADS” on page 4-50.

	Rear brake caliper bolt **27 Nm (2.7 m·kg, 19 ft·lb)**

6. Fill:
   - Brake fluid reservoir

   (with the specified amount of the recommended brake fluid)

	Recommended fluid **DOT 4**

EWA13090

WARNING

- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.**
- **When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.**

ECA13540

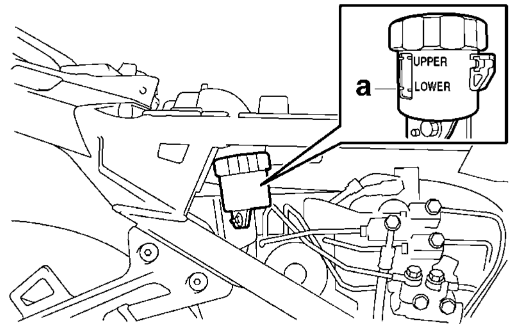
NOTICE

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

7. Bleed:
   - Brake system

   Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-31.
8. Check:
   - Brake fluid level

   Below the minimum level mark “a” → Add the recommended brake fluid to the proper level.
   Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-29.



9. Check:
   - Brake pedal operation

   Soft or spongy feeling → Bleed the brake system.
   Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-31.

EAS22700

REMOVING THE REAR BRAKE MASTER CYLINDER

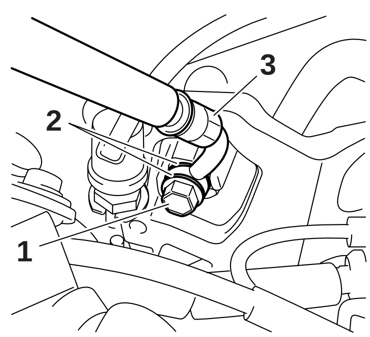
TIP

Before removing the rear brake master cylinder, drain the brake fluid from the entire brake system.

1. Remove:
   - Brake hose union bolt “1”
   - Copper washers “2”
   - Brake hose (rear brake master cylinder to brake pipe/middle joint assembly) “3”

TIP

To collect any remaining brake fluid, place a container under the master cylinder and the end of the brake hose.



EAS22720

CHECKING THE REAR BRAKE MASTER CYLINDER

1. Check:
   - Brake master cylinder

   Damage/scratches/wear → Replace.
   - Brake fluid delivery passages

   (brake master cylinder body)
   Obstruction → Blow out with compressed air.

2. Check:
   - Brake master cylinder kit
     Damage/scratches/wear → Replace.
3. Check:
   - Brake fluid reservoir
     Cracks/damage → Replace.
   - Brake fluid reservoir diaphragm
     Cracks/damage → Replace.
4. Check:
   - Brake hose
     Cracks/damage/wear → Replace.

EAS22730
ASSEMBLING THE REAR BRAKE MASTER CYLINDER

EWA13520
WARNING

- **Before installation, all internal brake components should be cleaned and lubricated with clean or new brake fluid.**
- **Never use solvents on internal brake components.**

	Recommended fluid **DOT 4**

EAS22740
INSTALLING THE REAR BRAKE MASTER CYLINDER

1. Install:
   - Copper washers **New**
   - Brake hose (rear brake master cylinder to brake pipe/middle joint assembly) “1”
   - Rear brake hose union bolt “2”

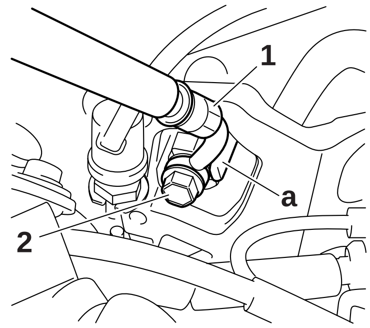
	Brake hose union bolt **30 Nm (3.0 m·kg, 22 ft·lb)**

EW3P66002
WARNING

Proper brake hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING (FJR13A)” on page 2-45 and “CABLE ROUTING (FJR13AE)” on page 2-65.

ECA14160
NOTICE

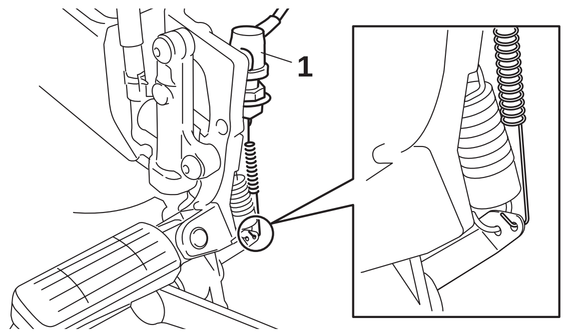
When installing the brake hose onto the brake master cylinder, make sure the brake pipe touches the projection “a” as shown.



2. Install:
   - Rear brake light switch “1”

TIP

Install the rear brake light switch spring as shown in the illustration.



3. Fill:
   - Brake fluid reservoir
     (with the specified amount of the recommended brake fluid)

	Recommended fluid **DOT 4**

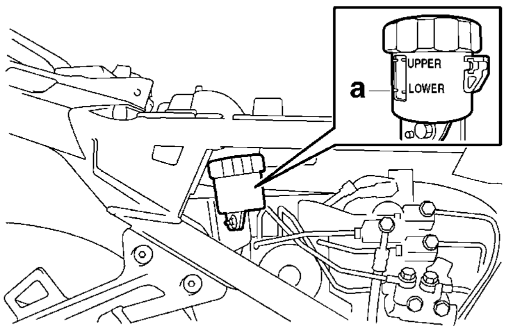
EWA13090
WARNING

- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.**
- **When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.**

ECA13540
NOTICE

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

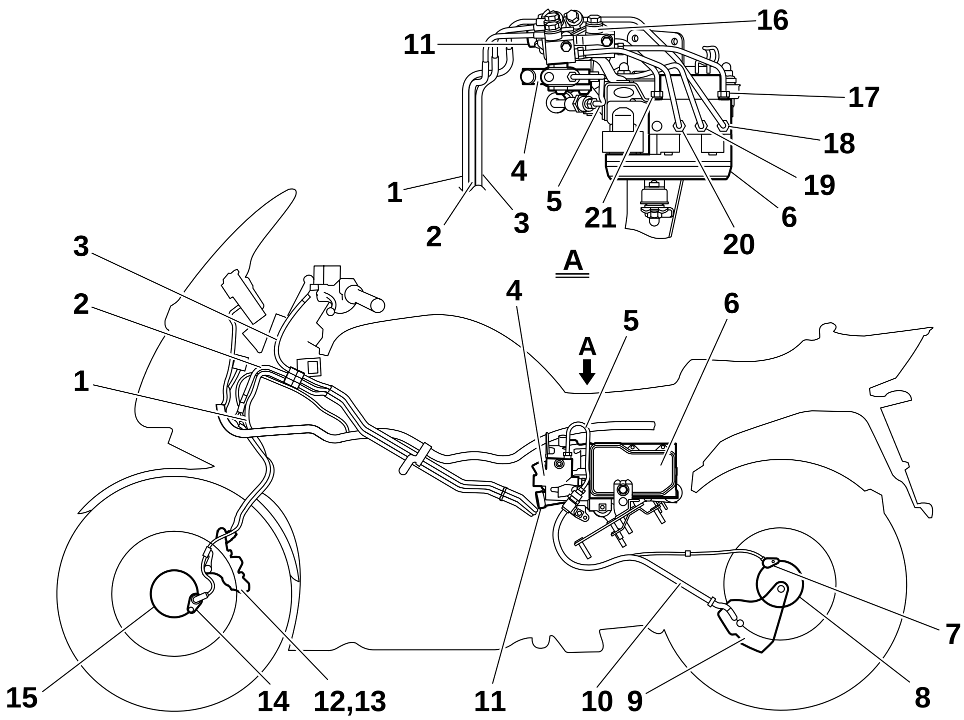
4. Bleed:
   - Brake system
     Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-31.
5. Check:
   - Brake fluid level
     Below the minimum level mark “a” → Add the recommended brake fluid to the proper level.
     Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-29.



6. Check:
   - Brake pedal operation
     Soft or spongy feeling → Bleed the brake system.
     Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-31.
7. Adjust:
   - Brake pedal position
     Refer to “ADJUSTING THE REAR DISC BRAKE” on page 3-28.
8. Adjust:
   - Rear brake light operation timing
     Refer to “ADJUSTING THE REAR BRAKE LIGHT SWITCH” on page 3-30.

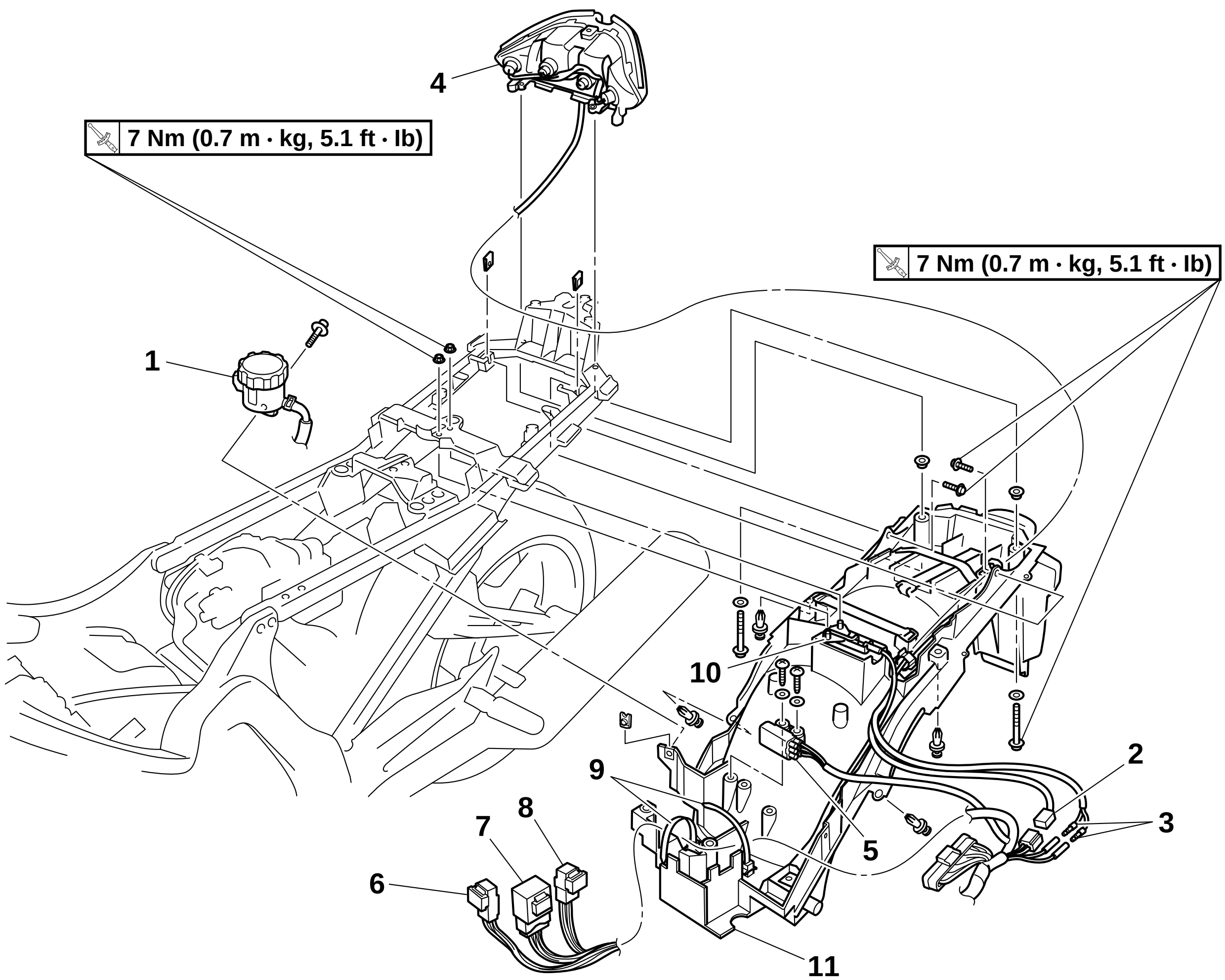
EAS22760
ABS (ANTI-LOCK BRAKE SYSTEM)

ET3P61060
ABS COMPONENTS CHART



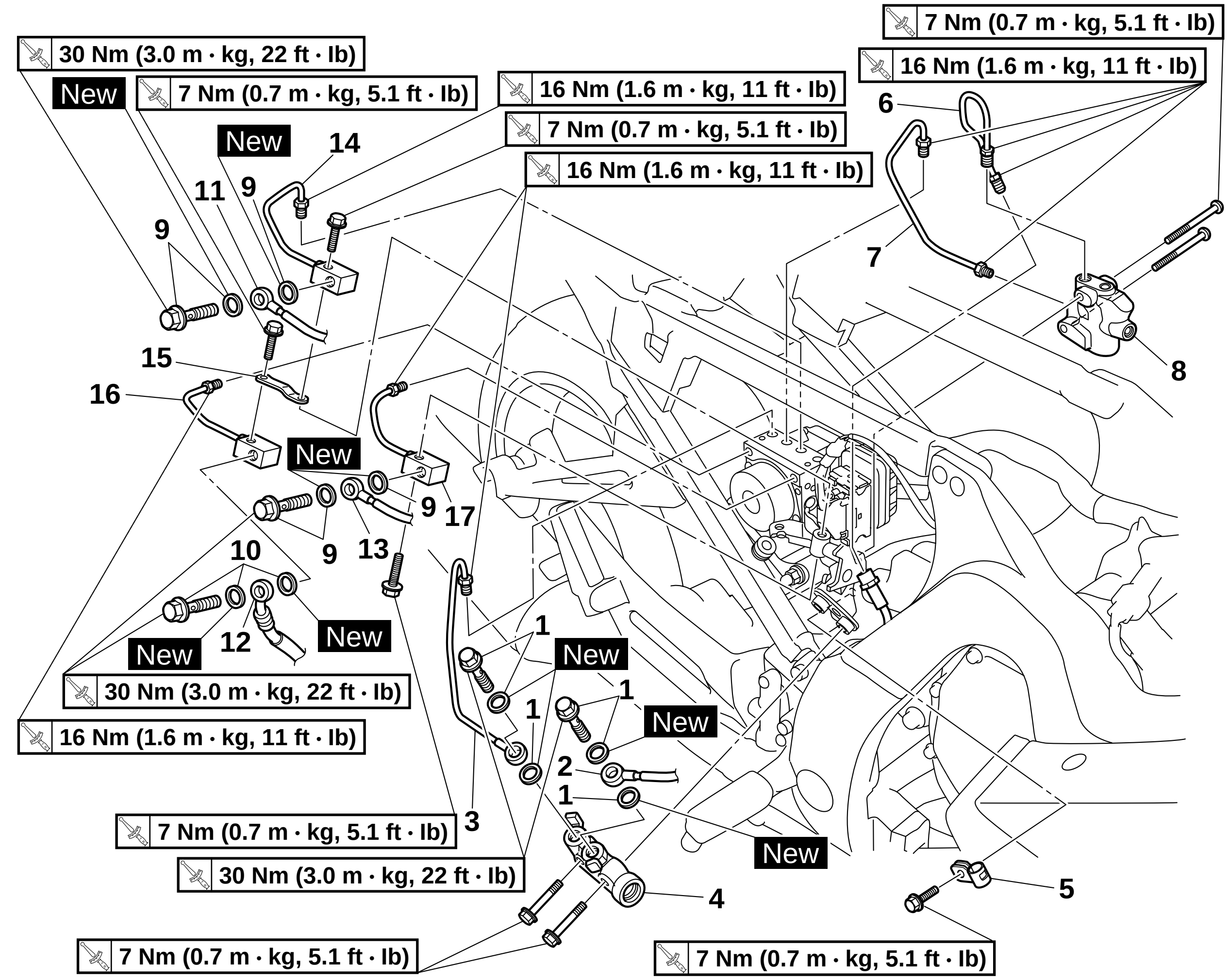
1. Brake hose (metering valve to right front brake caliper)
2. Brake hose (brake pipe/upper joint assembly to front brake calipers)
3. Brake hose (front brake master cylinder to brake pipe/lower joint assembly)
4. Proportioning valve
5. Brake pipe (proportioning valve to rear brake hose)
6. Hydraulic unit assembly
7. Rear wheel sensor
8. Rear wheel sensor rotor
9. Rear brake caliper
10. Brake hose (brake pipe to rear brake caliper)
11. Metering valve
12. Left front brake caliper
13. Right front brake caliper (partially operated together with the rear brake)
14. Front wheel sensor
15. Front wheel sensor rotor
16. Brake hose (rear brake master cylinder to brake pipe/middle joint assembly)
17. Brake pipe/middle joint assembly
18. Brake hose (hydraulic unit to metering valve)
19. Brake hose (hydraulic unit to proportioning valve)
20. Brake pipe/upper joint assembly
21. Brake pipe/lower joint assembly

Removing the rear fender assembly



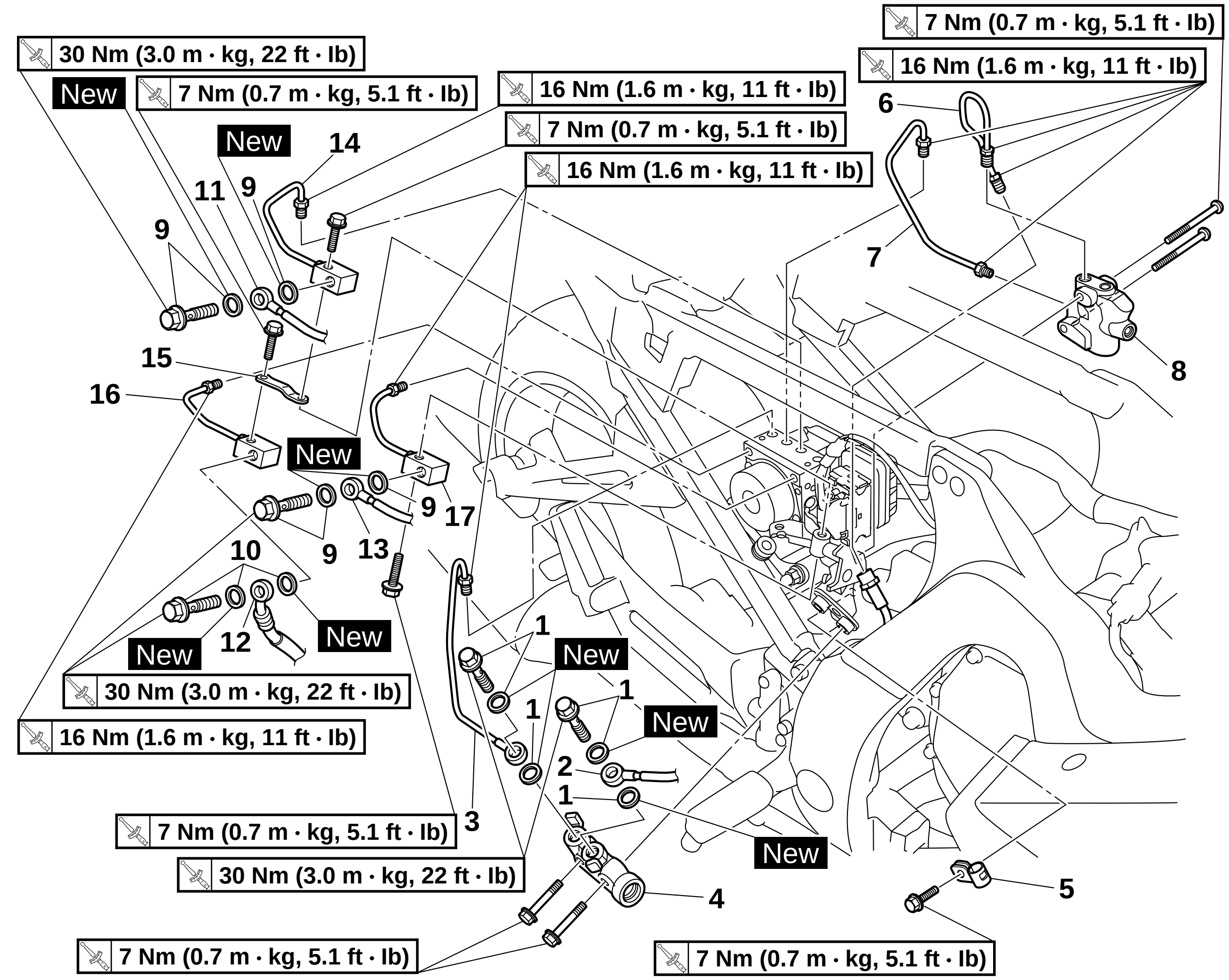
Order	Job/Parts to remove	Q'ty	Remarks
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Brake fluid		Drain. Refer to "BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)" on page 3-31.
1	Brake fluid reservoir	1	Refer to "REAR BRAKE" on page 4-44.
2	Tail/brake light assembly coupler	1	Disconnect.
3	License plate light connector	2	Disconnect.
4	Tail/brake light assembly	1	
5	Lean angle sensor	1	
6	Brake light relay	1	
7	Relay unit	1	
8	YCC-S control relay	1	FJR13AE
9	Plastic band	2	
10	Seat lock cable assembly	1	
11	Rear fender assembly	1	
			For installation, reverse the removal procedure.

Removing the metering valve, proportioning valve, and brake pipes



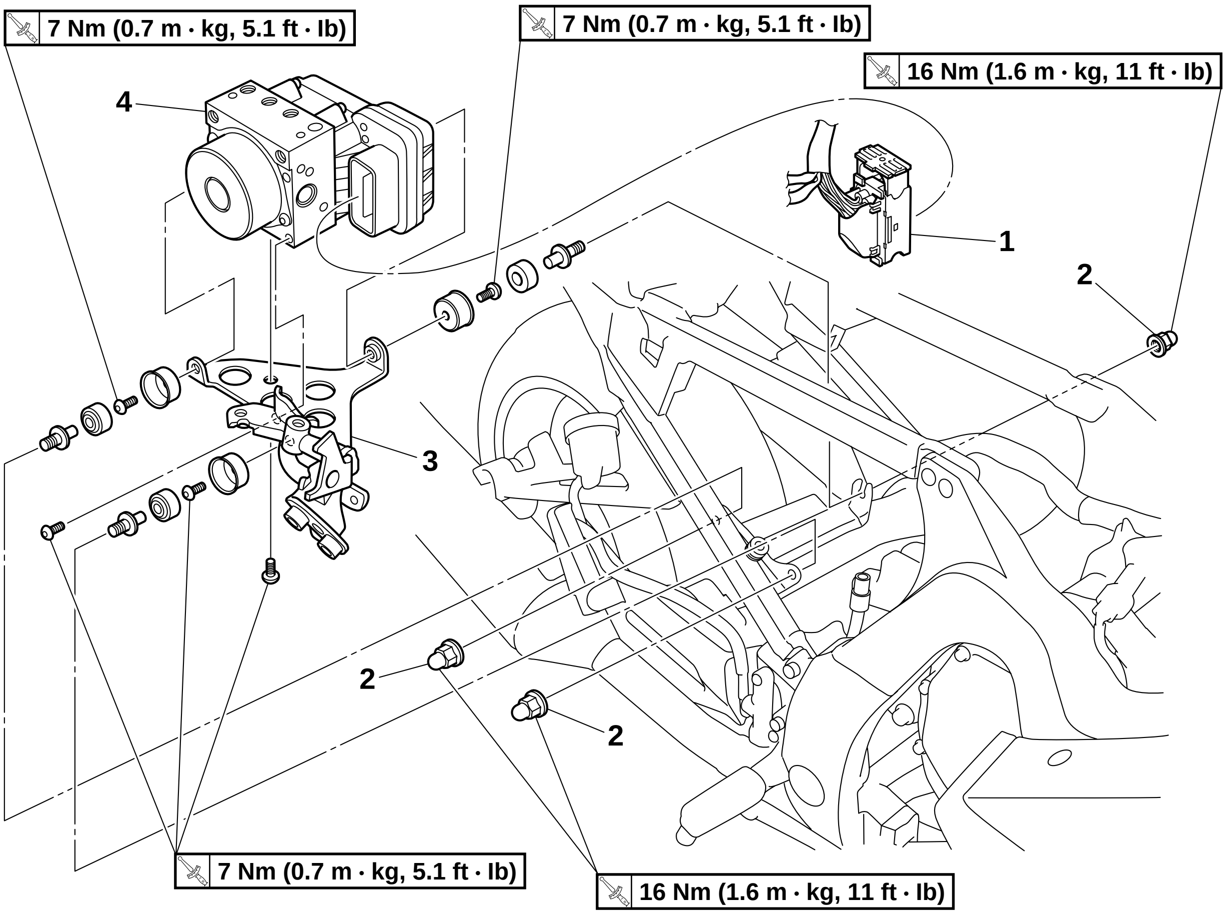
Order	Job/Parts to remove	Q'ty	Remarks
1	Brake pipe union bolt/Gasket	2/4	
2	Brake pipe (metering valve to right front brake caliper)	1	Disconnect.
3	Brake pipe (hydraulic unit to metering valve)	1	
4	Metering valve	1	
5	Brake hose holder	1	
6	Brake pipe (proportioning valve to rear brake hose)	1	
7	Brake pipe (hydraulic unit to proportioning valve)	1	
8	Proportioning valve	1	
9	Brake pipe union bolt/Gasket	2/4	
10	Brake hose union bolt/Gasket	1/2	
11	Brake pipe (brake pipe/upper joint assembly to front brake calipers)	1	Disconnect.
12	Brake hose (rear brake master cylinder to brake pipe/middle joint assembly)	1	Disconnect.
13	Brake pipe (front brake master cylinder to brake pipe/lower joint assembly)	1	Disconnect.
14	Brake pipe/upper joint assembly	1	

Removing the metering valve, proportioning valve, and brake pipes



Order	Job/Parts to remove	Q'ty	Remarks
15	Brake pipe/joint assembly stay	1	
16	Brake pipe/middle joint assembly	1	
17	Brake pipe/lower joint assembly	1	
			For installation, reverse the removal procedure.

Removing the hydraulic unit assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	ABS ECU coupler	1	Disconnect.
2	Cap nut	3	
3	Hydraulic unit assembly bracket	1	
4	Hydraulic unit assembly	1	
			For installation, reverse the removal procedure.

ET3P6D003
REMOVING THE HYDRAULIC UNIT ASSEMBLY

ECA3P6D018
NOTICE

Unless necessary, avoid removing and installing the brake pipes of the hydraulic unit assembly.

EWA13930
WARNING

Refill with the same type of brake fluid that is already in the system. Mixing fluids may result in a harmful chemical reaction, leading to poor braking performance.

ECA3P6D010
NOTICE

- **Handle the ABS components with care, since they have been accurately adjusted. Keep them away from dirt and do not subject them to shocks.**
- **Do not turn the main switch to "ON" when removing the hydraulic unit assembly.**
- **Do not clean with compressed air.**
- **Do not reuse the brake fluid.**
- **Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.**
- **Do not allow any brake fluid to contact the couplers. Brake fluid may damage the couplers and cause bad contacts.**
- **If the union bolts for the hydraulic unit assembly have been removed, be sure to tighten them to the specified torque and bleed the brake system.**

1. Remove:
   - Brake pipes
   - Brake hoses
   - Metering valve
   - Proportioning valve
   - Brake hose holder

TIP

Do not operate the brake lever and brake pedal while removing the brake hoses and brake pipes.

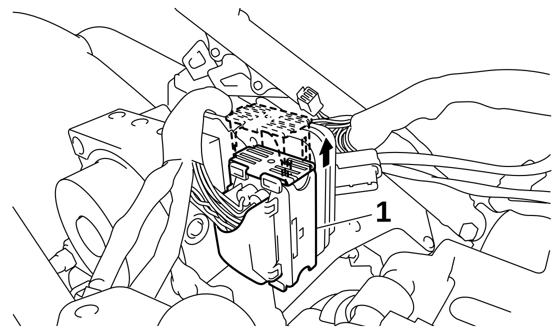
ECA3P6D011
NOTICE

When removing the brake hoses and brake pipes, cover the area around the hydraulic unit assembly to catch any spilt brake fluid. Do not allow the brake fluid to contact other parts.

2. Disconnect:
   - ABS ECU coupler "1"

TIP

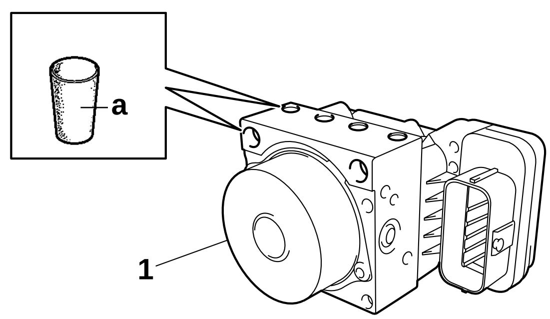
Pull the coupler ejection slider up to disconnect the ABS ECU coupler.



3. Remove:
   - Hydraulic unit assembly "1"

TIP

- To avoid brake fluid leakage and to prevent foreign materials from entering the hydraulic unit assembly, insert a rubber plug "a" or a bolt (M10 × 1.0) into each flare nut hole.
- When using a bolt, do not tighten the bolt until the bolt head touches the hydraulic unit. Otherwise, the brake pipe seating surface could be deformed.



ET3P6D004
CHECKING THE HYDRAULIC UNIT ASSEMBLY

1. Check:
   - Hydraulic unit assembly
     Cracks/damage → Replace the hydraulic unit assembly and the brake pipes that are connected to the assembly as a set.

ET3P61057

CHECKING THE PROPORTIONING VALVE AND METERING VALVE

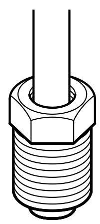
1. Check:
   - Proportioning valve
     Cracks/damage → Replace the proportioning valve.
   - Metering valve
     Cracks/damage → Replace the metering valve

ET3P6D020

CHECKING THE BRAKE PIPES

The following procedure applies to all of the brake pipes.

1. Check:
   - Brake pipe end (flare nut)
     Damage → Replace the hydraulic unit, brake pipes, and related parts as a set.



ET3P6D005

INSTALLING THE HYDRAULIC UNIT ASSEMBLY

1. Install:
   - Hydraulic unit assembly

TIP

Do not allow any foreign materials to enter the hydraulic unit assembly or the brake hoses or brake pipes when installing the hydraulic unit assembly.

ECA3P6D012

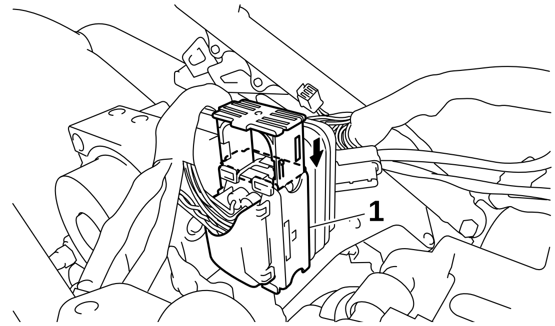
NOTICE

Do not remove the rubber plugs or bolts (M10 × 1.0) installed in the flare nut holes before installing the hydraulic unit assembly.

2. Remove:
   - Rubber plugs or bolts (M10 × 1.0)
3. Connect:
   - ABS ECU coupler “1”

TIP

Push the coupler ejection slider down until a click is heard, making sure that is installed securely.



4. Install:
   - Brake pipe/lower joint assembly “1”
   - Brake pipe/middle joint assembly “2”
   - Brake pipe/joint assembly stay “3”
   - Brake pipe/upper joint assembly “4”

TIP

Temporarily tighten the brake pipe/joint assembly flare nuts and bolts.

5. Tighten:
   - Brake pipe/joint assembly flare nuts “5”
   - Brake pipe/joint assembly bolts “6”

Brake pipe/joint assembly flare nut
16 Nm (1.6 m·kg, 11 ft·lb)
Brake pipe/joint assembly bolt
7 Nm (0.7 m·kg, 5.1 ft·lb)

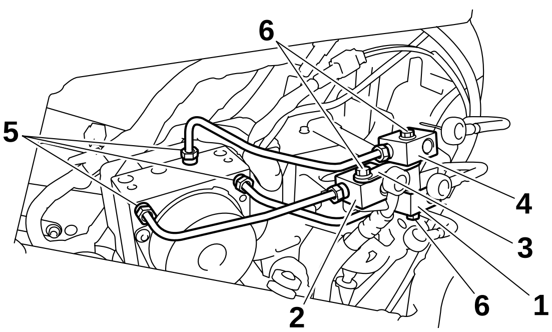
ECA3P6D022

NOTICE

If the brake pipe flare nut does not turn easily, replace the hydraulic unit, brake pipes, and related parts as a set.

TIP

First tighten the brake pipe/joint assembly flare nuts, then the brake pipe/joint assembly bolts.



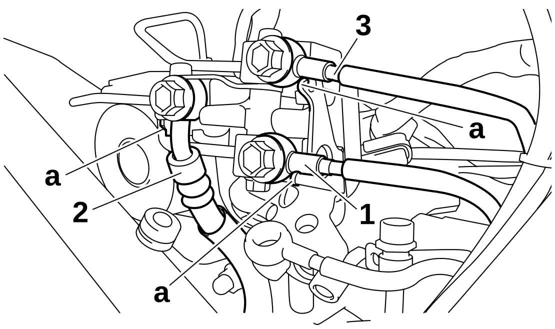
6. Install:
   - Brake pipe (front brake master cylinder to brake pipe/lower joint assembly) “1”
   - Brake hose (rear brake master cylinder to brake pipe/middle joint assembly) “2”

- Brake pipe (brake pipe/upper joint assembly to front brake calipers) “3”
- Gaskets **New**
- Brake pipe union bolts
- Brake hose union bolt

> **Brake pipe union bolt**
> **30 Nm (3.0 m·kg, 22 ft·lb)**
> **Brake hose union bolt**
> **30 Nm (3.0 m·kg, 22 ft·lb)**

TIP

When installing the brake hose and brake pipes onto the brake pipe joint assembly or brake hose joint assembly, make sure that the brake pipes touch the projections “a” on the hydraulic unit assembly bracket.



7. Install:
   - Proportioning valve “1”
   - Brake pipe (hydraulic unit to proportioning valve) “2”

> **Proportioning valve bolt**
> **7 Nm (0.7 m·kg, 5.1 ft·lb)**

TIP

Temporarily install the brake pipe.

8. Tighten:
   - Brake pipe flare nuts

> **Brake pipe flare nut**
> **16 Nm (1.6 m·kg, 11 ft·lb)**

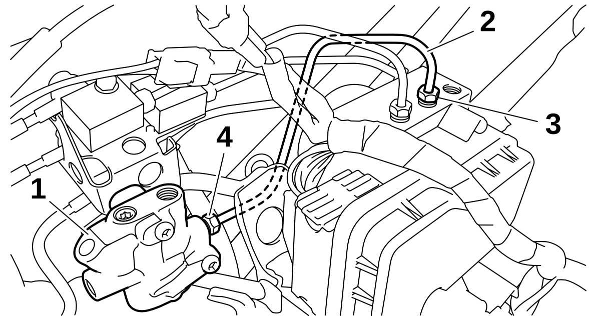
ECA3P6D022

NOTICE

If the brake pipe flare nut does not turn easily, replace the hydraulic unit, brake pipes, and related parts as a set.

TIP

First tighten the flare nut “3” on the hydraulic unit assembly end of the brake pipe, then the flare nut “4” on the proportioning valve end.



9. Install:
   - Brake pipe (proportioning valve to rear brake hose) “1”
   - Brake hose holder “2”

TIP

Temporarily tighten the brake pipe flare nuts and brake hose holder bolt.

10. Tighten:
    - Brake pipe flare nuts “3”
    - Brake hose holder bolt “4”

> **Brake pipe flare nut**
> **16 Nm (1.6 m·kg, 11 ft·lb)**
> **Brake hose holder bolt**
> **7 Nm (0.7 m·kg, 5.1 ft·lb)**

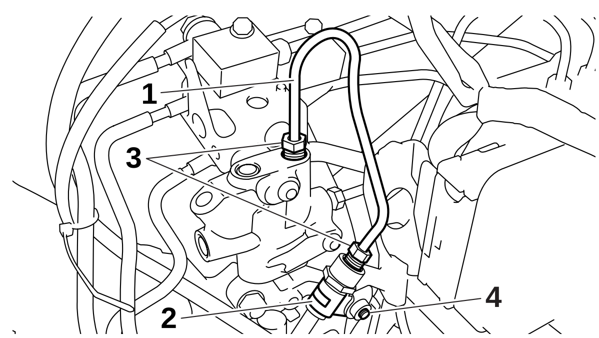
ECA3P6D022

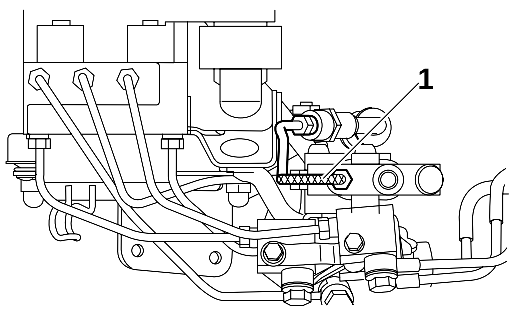
NOTICE

If the brake pipe flare nut does not turn easily, replace the hydraulic unit, brake pipes, and related parts as a set.

TIP

- First tighten the brake pipe flare nut, then the brake hose holder bolt.
- Make sure that the brake pipe is parallel to the proportioning valve as shown in the illustration.
- Do not bend the brake pipe when tightening the brake pipe flare nuts.





11.Install:
- Metering valve “1”
- Brake pipe (metering valve to right front brake caliper) “2”
- Brake pipe (hydraulic unit to metering valve) “3”
- Gaskets **New**
- Brake pipe union bolts

TIP

Temporarily install the metering valve and brake pipes.

12.Tighten:
- Brake pipe flare nut “4”
- Metering valve bolts “5”
- Brake pipe union bolts “6”

Brake pipe flare nut
16 Nm (1.6 m·kg, 11 ft·lb)
Metering valve bolt
7 Nm (0.7 m·kg, 5.1 ft·lb)
Brake pipe union bolt
30 Nm (3.0 m·kg, 22 ft·lb)

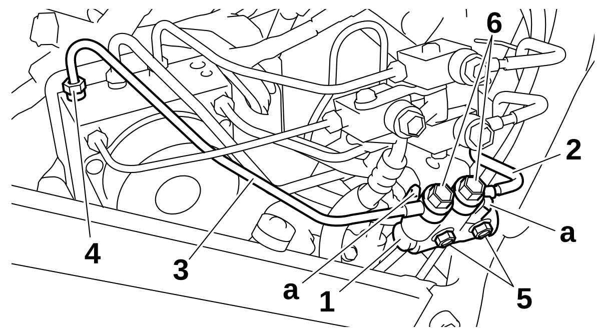
ECA3P6D022

NOTICE

If the brake pipe flare nut does not turn easily, replace the hydraulic unit, brake pipes, and related parts as a set.

TIP

- First tighten the brake pipe flare nut and metering valve bolts, then the brake pipe union bolts.
- When tightening the brake pipes onto the metering valve, make sure that the brake pipes touch the projections “a” on the metering valve.



13.Fill:
- Brake master cylinder reservoir
- Brake fluid reservoir
  (with the specified amount of the recommended brake fluid)

Recommended fluid
DOT 4

EWA13090

WARNING

- **Use only the designated brake fluid. Other brake fluids may cause the rubber seals to deteriorate, causing leakage and poor brake performance.**
- **Refill with the same type of brake fluid that is already in the system. Mixing brake fluids may result in a harmful chemical reaction, leading to poor brake performance.**
- **When refilling, be careful that water does not enter the brake fluid reservoir. Water will significantly lower the boiling point of the brake fluid and could cause vapor lock.**

ECA13540

NOTICE

Brake fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt brake fluid immediately.

14.Bleed:
- Brake system
  Refer to “BLEEDING THE HYDRAULIC BRAKE SYSTEM (ABS)” on page 3-31.

15.Check the operation of the hydraulic unit according to the brake lever and the brake pedal response. (Refer to “HYDRAULIC UNIT OPERATION TESTS” on page 4-66.)

ECA14770

NOTICE

Always check the operation of the hydraulic unit according to the brake lever and the brake pedal response.

16. Delete the fault codes. (Refer to “[D-1] DELETING THE FAULT CODES” on page 8-167.)
17. Perform a trial run. (Refer to “TRIAL RUN” on page 4-69.)

EAS22800

HYDRAULIC UNIT OPERATION TESTS

The reaction-force pulsating action generated in the brake lever and brake pedal when the ABS is activated can be tested when the vehicle is stopped.

The hydraulic unit operation can be tested using the following two methods.

- Hydraulic unit operation test 1: this test checks the function of the ABS after the system was disassembled, adjusted, or serviced.
- Hydraulic unit operation test 2: this test generates the same reaction-force pulsating action that is generated in the brake lever and brake pedal when the ABS is activated.

Hydraulic unit operation test 1

EWA13120

WARNING

Securely support the vehicle so that there is no danger of it falling over.

TIP

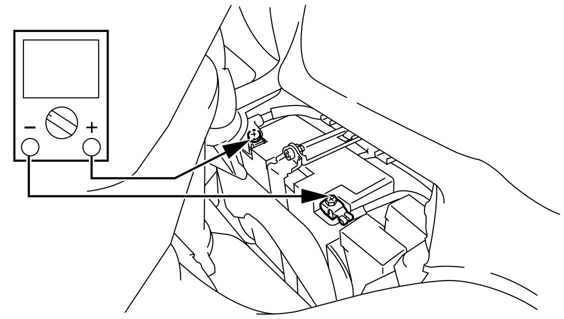
Two people are necessary to perform hydraulic unit operation test 1.

1. Place the vehicle on the centerstand.
2. Turn the main switch to “OFF”.
3. Remove:
   - Front cowling right inner panel 1
     Refer to “GENERAL CHASSIS” on page 4-1.
4. Check:
   - Battery voltage
     Lower than 12.8 V → Charge or replace the battery.

Battery voltage
Higher than 12.8 V

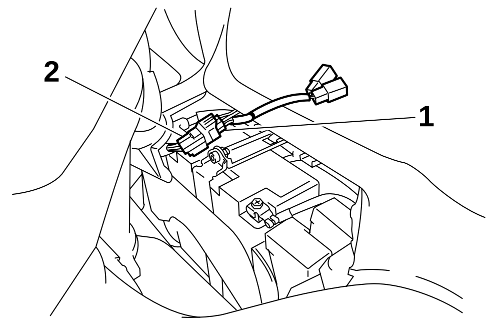
TIP

- If the battery voltage is lower than 12.8 V, charge the battery, and then perform hydraulic unit operation test 1.
- If the battery voltage is lower than 10 V, the ABS warning light comes on and the ABS does not operate.



5. Connect the test coupler adapter “1” to the ABS test coupler “2”.

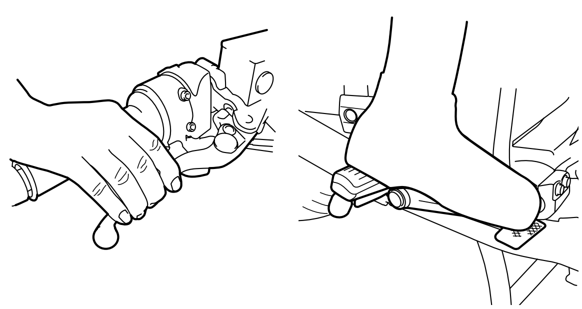
Test coupler adapter
90890-03149



6. Turn the main switch to “ON” while operating the brake lever and the brake pedal simultaneously.

TIP

- This check cannot be performed unless both the brake lever and the brake pedal are operated simultaneously when the main switch is turned to “ON”.
- Do not push the start switch when turning the main switch to “ON”, otherwise the operation test will not begin.

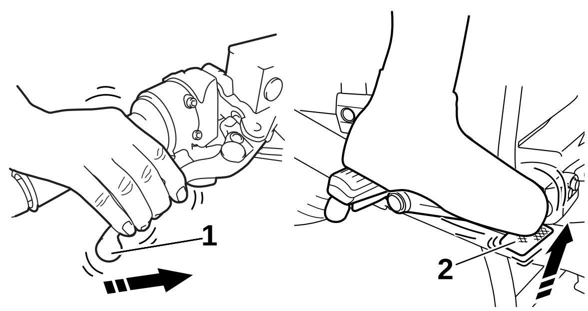


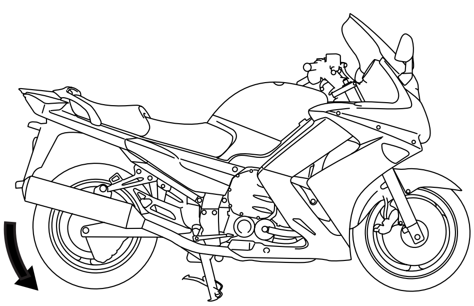
7. Check:
   - Hydraulic unit operation

When the main switch is turned to “ON”, a single pulse will be generated in the brake lever “1”. After the pulse is generated in the brake lever, it is generated in the brake pedal “2” twice.

TIP

A single pulse will be felt in the brake lever once, then in the brake pedal twice. The second person should confirm that the rear brake force is released during the second pulse in the brake pedal, third pulse overall, by manually applying force to rotate the rear wheel. If the rear brake force is released during the second pulse in the brake pedal, the second person will be able to rotate the rear wheel for 0.1 second.





ECA3P6D019

NOTICE

- **Check that the pulse is felt in the brake lever once, and then in the brake pedal twice.**
- **If the pulse is felt in the brake pedal before it is felt in the brake lever, check that the brake hoses and brake pipes are connected correctly to the hydraulic unit assembly.**
- **If the rear brake force is not released during the second pulse in the brake pedal, but during the pulse in the brake lever or during the first pulse in the brake pedal, check that the brake hoses and brake pipes are connected correctly to the hydraulic unit assembly.**
- **If the pulse is hardly felt in either the brake lever or brake pedal, check that the brake hoses and brake pipes are connected correctly to the hydraulic unit assembly.**

- If the operation of the hydraulic unit is normal, delete all of the fault codes.

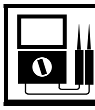
Hydraulic unit operation test 2

EWA13120

WARNING

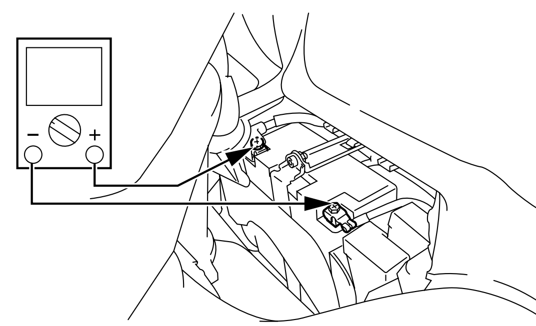
Securely support the vehicle so that there is no danger of it falling over.

1. Place the vehicle on the centerstand.
2. Turn the main switch to “OFF”.
3. Remove:
   - Front cowling right inner panel 1
     Refer to “GENERAL CHASSIS” on page 4-1.
4. Check:
   - Battery voltage
     Lower than 12.8 V → Charge or replace the battery.

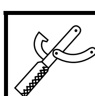
	**Battery voltage** **Higher than 12.8 V**

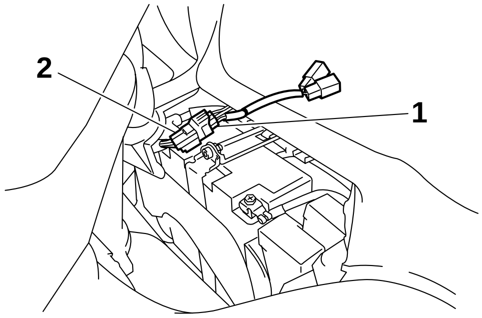
TIP

- If the battery voltage is lower than 12.8 V, charge the battery, and then perform hydraulic unit operation test 2.
- If the battery voltage is lower than 10 V, the ABS warning light comes on and the ABS does not operate.

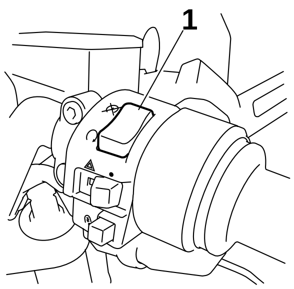


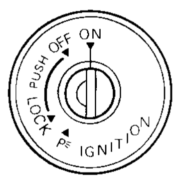
5. Connect the test coupler adapter “1” to the ABS test coupler “2”.

	**Test coupler adapter** **90890-03149**



6. Set the engine stop switch “1” to “⊗”.
7. Turn the main switch to “ON”.



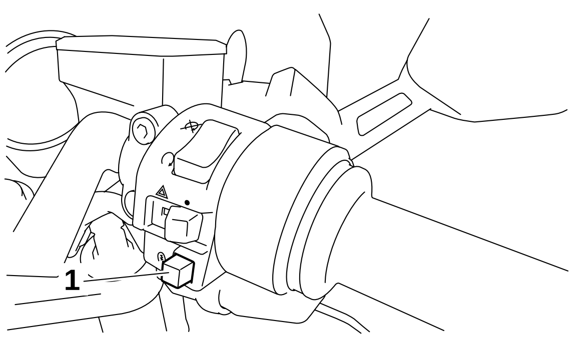


8. Push the start switch “1” for at least 4 seconds.

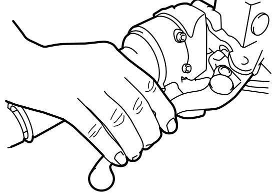
ECA14790

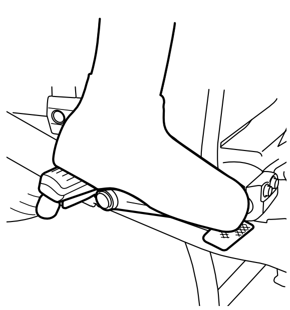
NOTICE

Do not operate the brake lever or the brake pedal.



9. After releasing the start switch, operate the brake lever and the brake pedal simultaneously.

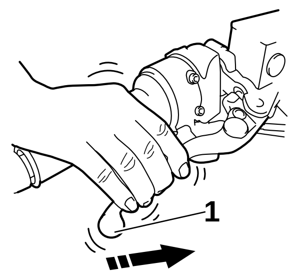




10. A reaction-force pulsating action is generated in the brake lever “1” 0.5 second after the brake lever and the brake pedal are operated simultaneously and continues for approximately 1.5 seconds.

TIP

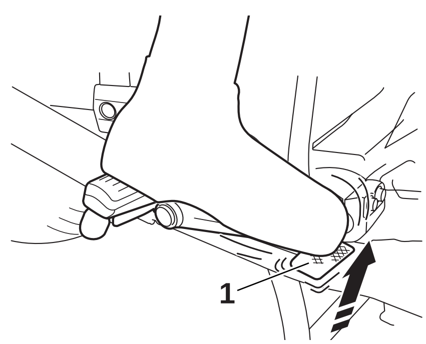
- The reaction-force pulsating action consists of quick pulses.
- Be sure to continue operating the brake lever and brake pedal even after the pulsating action has stopped.



11. After the pulsating action has stopped in the brake lever, it is generated in the brake pedal “1” 0.5 second later and continues for approximately 2 seconds.

TIP

- The reaction-force pulsating action consists of quick pulses.
- Be sure to continue operating the brake lever and brake pedal even after the pulsating action has stopped.



12. After the pulsating action has stopped in the brake pedal, it is generated in the brake lever 0.5 second later and continues for approximately 1.5 seconds.

TIP

The reaction-force pulsating action consists of quick pulses.

ECA3P6D020

NOTICE

- **Check that the pulsating action is felt in the brake lever, brake pedal, and again in the brake lever, in this order.**
- **If the pulsating action is felt in the brake pedal before it is felt in the brake lever, check that the brake hoses and brake pipes are connected correctly to the hydraulic unit assembly.**
- **If the pulsating action is hardly felt in either the brake lever or brake pedal, check that the brake hoses and brake pipes are connected correctly to the hydraulic unit assembly.**

13. Turn the main switch to “OFF”.
14. Remove the test coupler adapter from the ABS test coupler.
15. Turn the main switch to “ON”.
16. Set the engine stop switch to “◯”.
17. Check for brake fluid leakage around the hydraulic unit.
    Brake fluid leakage → Replace the hydraulic unit, brake pipes, and related parts as a set.

EAS22820

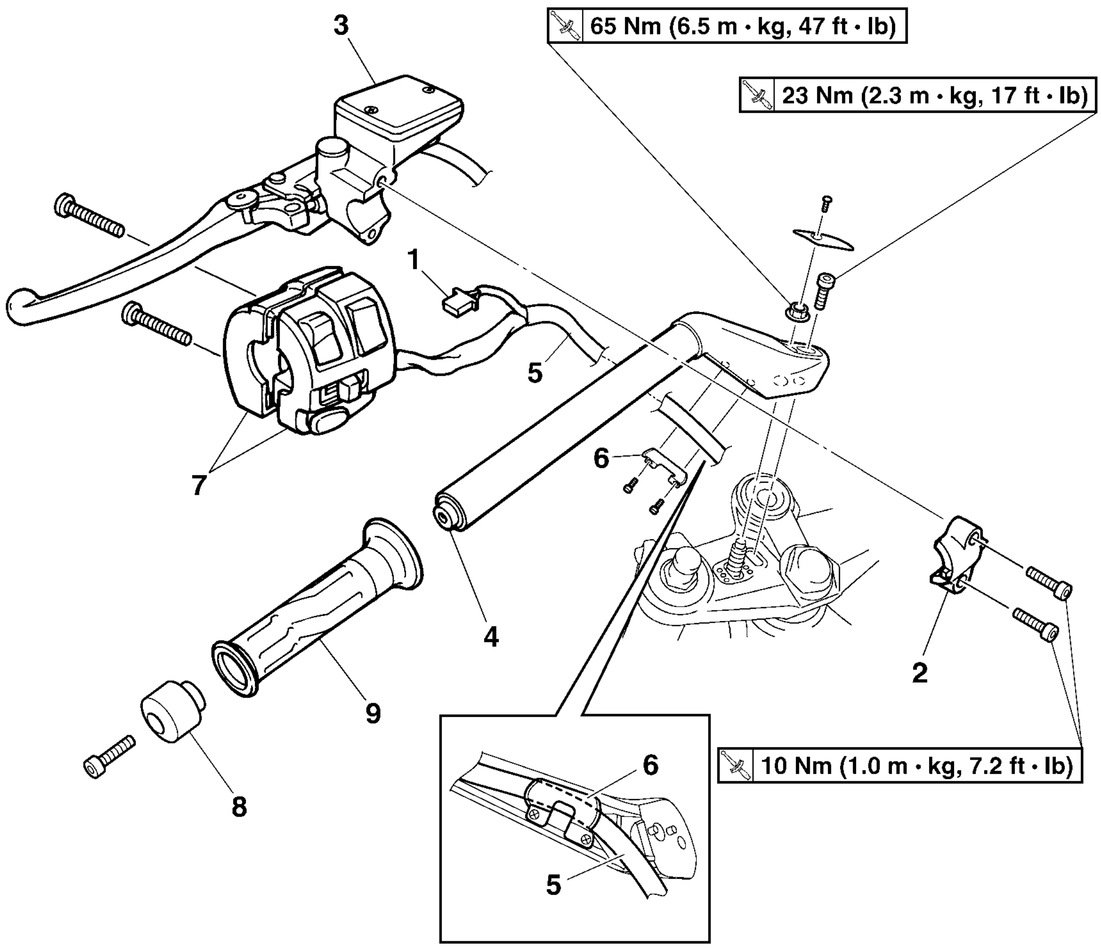
TRIAL RUN

After all checks and servicing are completed, always ensure the vehicle has no problems by performing a trial run at a speed of faster than 30 km/h.

EAS22850

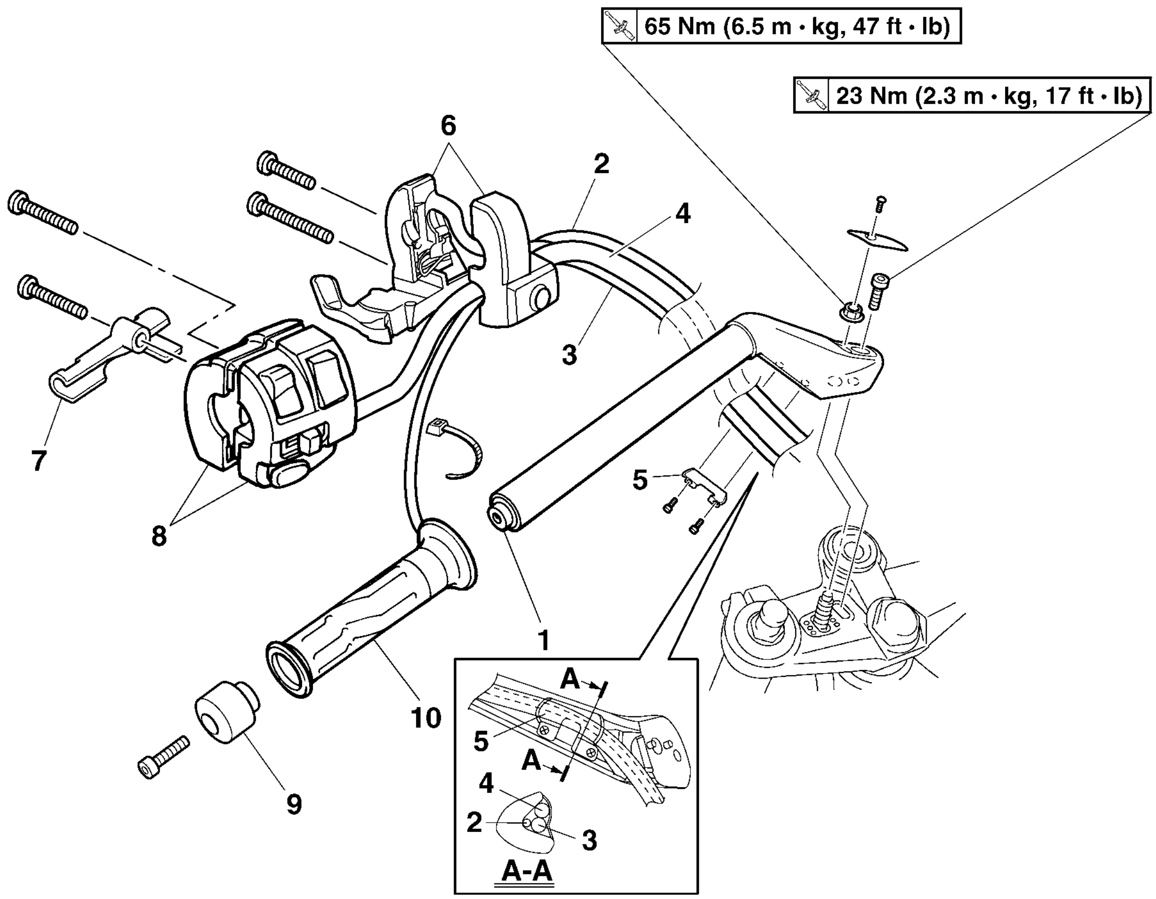
HANDLEBARS

Removing the left handlebar (FJR13A)



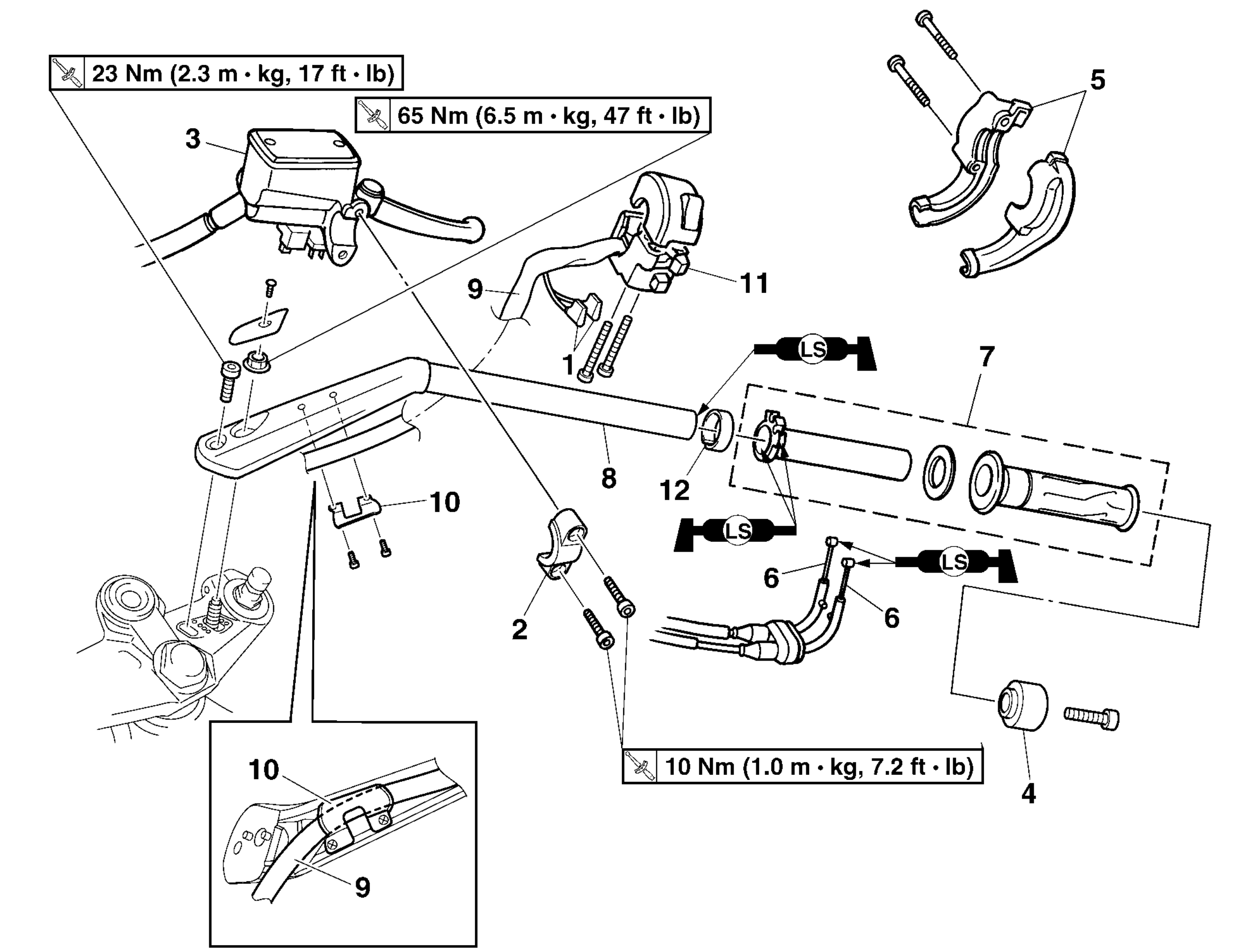
Order	Job/Parts to remove	Q'ty	Remarks
1	Clutch switch coupler	1	Disconnect.
2	Clutch master cylinder holder	1	
3	Clutch master cylinder assembly	1	
4	Left handlebar	1	
5	Left handlebar switch lead	1	
6	Lead holder	1	
7	Left handlebar switch	1	
8	Grip end	1	
9	Handlebar grip	1	
			For installation, reverse the removal procedure.

Removing the left handlebar (FJR13AE)



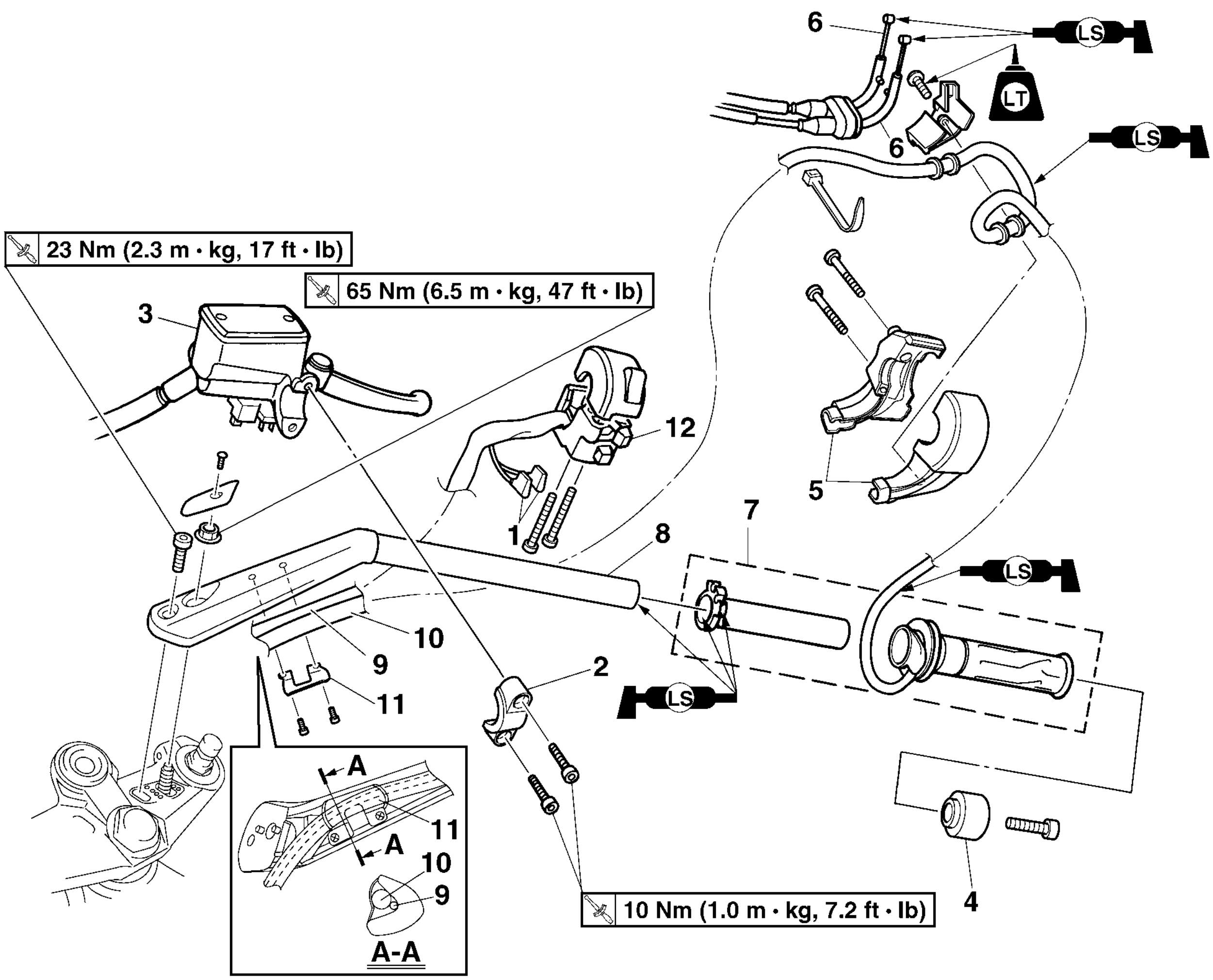
Order	Job/Parts to remove	Q'ty	Remarks
1	Left handlebar	1	
2	Left grip warmer lead	1	
3	Hand shift switch lead	1	
4	Left handlebar switch lead	1	
5	Lead holder 1	1	
6	Hand shift switch	1	
7	Lead holder 2	1	
8	Left handlebar switch	1	
9	Grip end	1	
10	Handlebar grip	1	
			For installation, reverse the removal procedure.

Removing the right handlebar (FJR13A)



Order	Job/Parts to remove	Q'ty	Remarks
1	Front brake light switch connector	2	Disconnect.
2	Front brake master cylinder holder	1	
3	Front brake master cylinder assembly	1	
4	Grip end	1	
5	Throttle cable housing	2	
6	Throttle cable	2	Disconnect.
7	Throttle grip	1	
8	Right handlebar	1	
9	Right handlebar switch lead	1	
10	Lead holder	1	
11	Right handlebar switch	1	
12	Collar	1	
			For installation, reverse the removal procedure.

Removing the right handlebar (FJR13AE)



Order	Job/Parts to remove	Q'ty	Remarks
1	Front brake light switch connector	2	Disconnect.
2	Front brake master cylinder holder	1	
3	Front brake master cylinder assembly	1	
4	Grip end	1	
5	Throttle cable housing	2	
6	Throttle cable	2	Disconnect.
7	Throttle grip	1	
8	Right handlebar	1	
9	Right grip warmer lead	1	
10	Right handlebar switch lead	1	
11	Lead holder	1	
12	Right handlebar switch	1	
			For installation, reverse the removal procedure.

EAS22870

REMOVING THE HANDLEBARS

1. Stand the vehicle on a level surface.

EWA13120

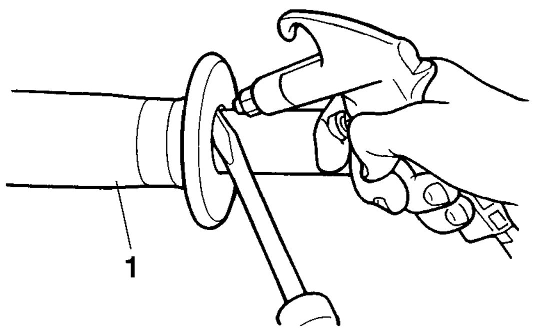
WARNING

Securely support the vehicle so that there is no danger of it falling over.

2. Remove:
   - Handlebar grip “1”

TIP

Blow compressed air between the handlebar and the handlebar grip, and gradually push the grip off the handlebar.



EAS22890

CHECKING THE HANDLEBARS

1. Check:
   - Left handlebar
   - Right handlebar

   Bends/cracks/damage → Replace.

EWA13690

WARNING

Do not attempt to straighten a bent handlebar as this may dangerously weaken it.

EAS22900

INSTALLING THE HANDLEBARS (FJR13A)

1. Stand the vehicle on a level surface.

EWA13120

WARNING

Securely support the vehicle so that there is no danger of it falling over.

2. Install:
   - Handlebar grip
   - Grip end “1”

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Apply a thin coat of rubber adhesive onto the end of the left handlebar.
b. Slide the handlebar grip onto the left handlebar.
c. Wipe off any excess rubber adhesive with a clean rag.

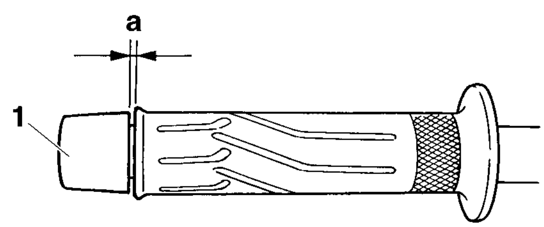
EWA13700

WARNING

Do not touch the handlebar grip until the rubber adhesive has fully dried.

TIP

There should be 1–3 mm (0.04–0.12 in) of clearance “a” between the handlebar grip and the grip end.

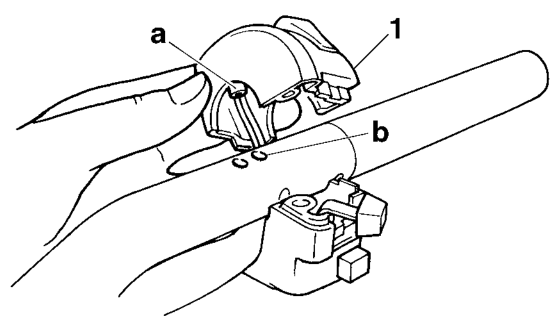


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3. Install:
   - Collar
   - Right handlebar switch “1”

TIP

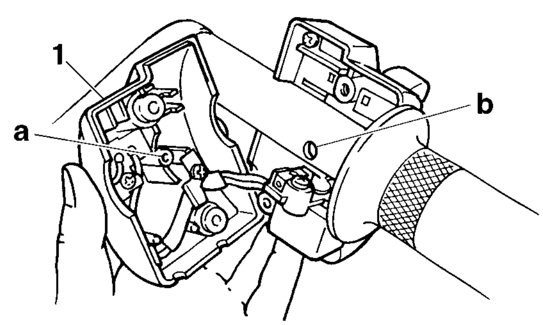
Align the projection “a” on the right handlebar switch with the hole “b” on the right handlebar.



4. Install:
   - Left handlebar switch “1”

TIP

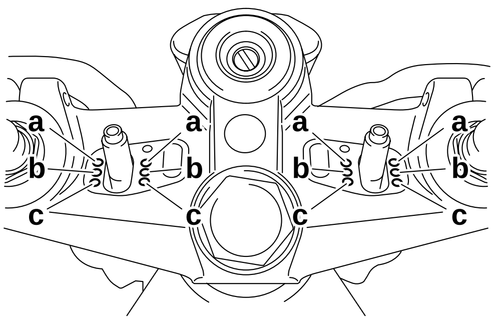
Align the projection “a” on the left handlebar switch with the hole “b” on the left handlebar.



5. Install:
   - Right handlebar
   - Left handlebar

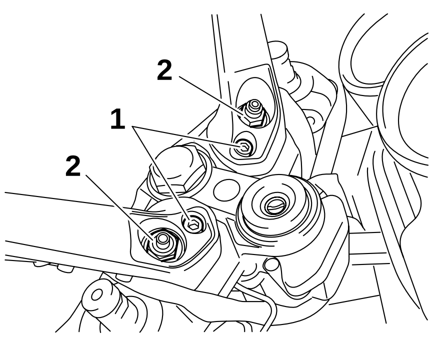
TIP

Fit the projections on each handlebar into the holes in the upper bracket, making sure that the handlebars are installed in the same position.



a. Front position
b. Standard position
c. Rear position

6. Install:
   - Handlebar bolts “1” (temporarily)
   - Handlebar nuts “2” (temporarily)



7. Tighten:
   - Handlebar bolts
   - Handlebar nuts

Handlebar bolt
23 Nm (2.3 m·kg, 17 ft·lb)
Handlebar nut
65 Nm (6.5 m·kg, 47 ft·lb)

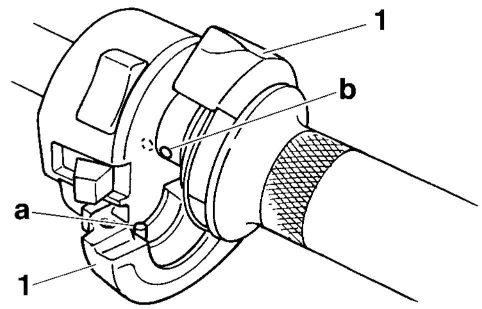
TIP

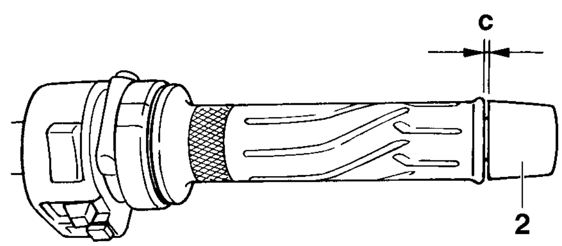
First tighten the bolts, then tighten the nuts.

8. Install:
   - Throttle grip
   - Throttle cables
   - Throttle cable housing “1”
   - Grip end “2”

TIP

- Align the projection “a” on the throttle cable housing with the hole “b” in the right handlebar.
- There should be 1–3 mm (0.04–0.12 in) of clearance “c” between the throttle grip and the grip end.



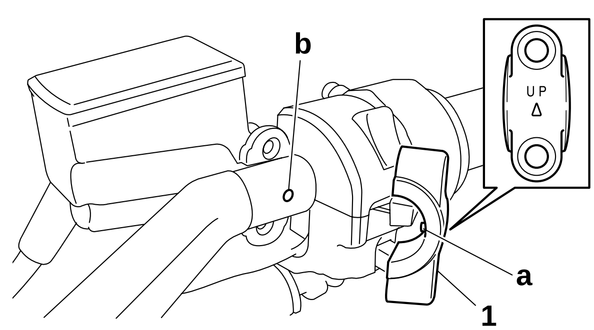


9. Install:
   - Front brake master cylinder assembly
   - Front brake master cylinder holder “1”

Front brake master cylinder holder bolt
10 Nm (1.0 m·kg, 7.2 ft·lb)

TIP

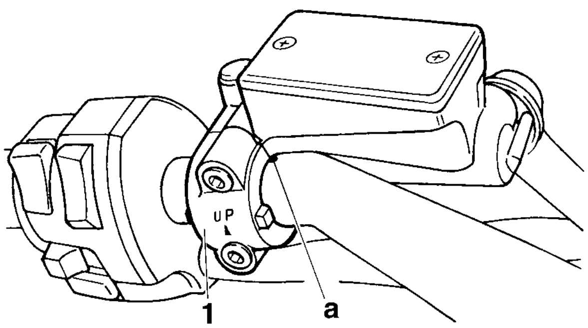
- Install the brake master cylinder holder with the “UP” mark facing up.
- Align the projection “a” on the front brake master cylinder with hole “b” on the right handlebar.
- First, tighten the upper bolt, then the lower bolt.



10.Install:
- Clutch master cylinder assembly
- Clutch master cylinder holder “1”

	Clutch master cylinder holder bolt **10 Nm (1.0 m·kg, 7.2 ft·lb)**

TIP
- Install the clutch master cylinder holder with the “UP” mark facing up
- Align the mating surfaces of the clutch master cylinder holder with the punch mark “a” on the left handlebar.
- First, tighten the upper bolt, then the lower bolt.



11.Adjust:
- Throttle cable free play
  Refer to “ADJUSTING THE THROTTLE CABLE FREE PLAY” on page 3-10.

	Throttle cable free play **3.0–5.0 mm (0.12–0.20 in)**

ET3P66031
INSTALLING THE HANDLEBARS (FJR13AE)
1. Stand the vehicle on a level surface.

EWA13120
WARNING

Securely support the vehicle so that there is no danger of it falling over.

2. Install:
   - Handlebar grip
   - Grip end “1”

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Apply a thin coat of rubber adhesive onto the end of the left handlebar.

	Recommended adhesive **Three Bond 1530®**

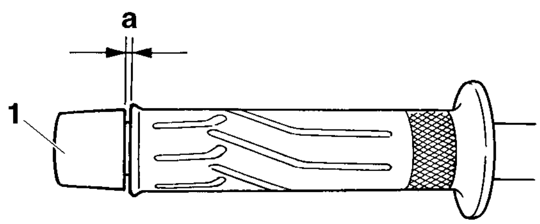
b. Slide the handlebar grip onto the left handlebar.
c. Wipe off any excess rubber adhesive with a clean rag.

EWA13700
WARNING

Do not touch the handlebar grip until the rubber adhesive has fully dried.

TIP

There should be 1–3 mm (0.04–0.12 in) of clearance “a” between the handlebar grip and the grip end.

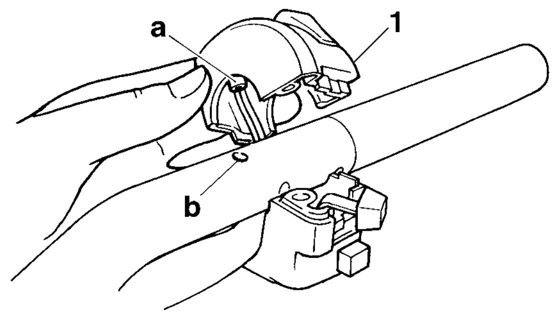


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3. Install:
   - Right handlebar switch “1”

TIP

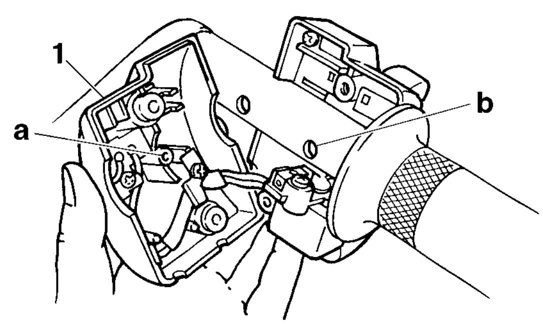
Align the projection “a” on the right handlebar switch with the hole “b” on the right handlebar.



4. Install:
   - Left handlebar switch “1”

TIP

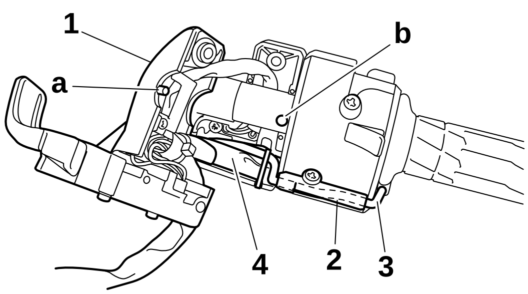
Align the projection “a” on the left handlebar switch with the hole “b” on the left handlebar.



5. Install:
   - Hand shift switch “1”
   - Lead holder 2 “2”

TIP

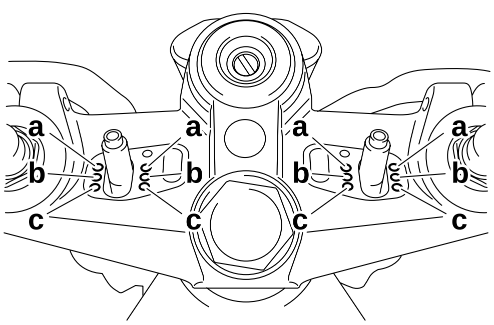
- Align the projection “a” on the hand shift switch with hole “b” on the left handlebar.
- When installing the hand shift switch, route the left grip warmer lead “3” and left handlebar switch lead “4” through the switch as shown in the illustration, making sure to fasten the left grip warmer lead with the lead holder 2.
- After installing the hand shift switch, check that the left grip warmer lead does not interfere with the movement of the hand shift lever.



6. Install:
   - Right handlebar
   - Left handlebar

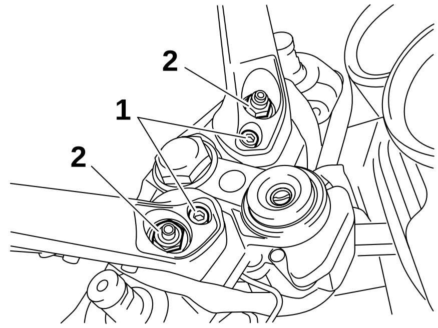
TIP

Fit the projections on each handlebar into the holes in the upper bracket, making sure that the handlebars are installed in the same position.

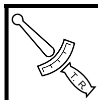


a. Front position
b. Standard position
c. Rear position

7. Install:
   - Handlebar bolts “1” (temporarily)
   - Handlebar nuts “2” (temporarily)



8. Tighten:
   - Handlebar bolts
   - Handlebar nuts



Handlebar bolt
23 Nm (2.3 m·kg, 17 ft·lb)
Handlebar nut
65 Nm (6.5 m·kg, 47 ft·lb)

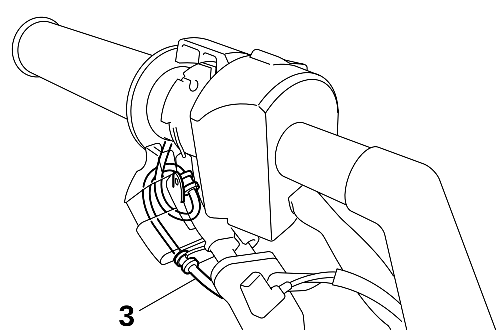
TIP

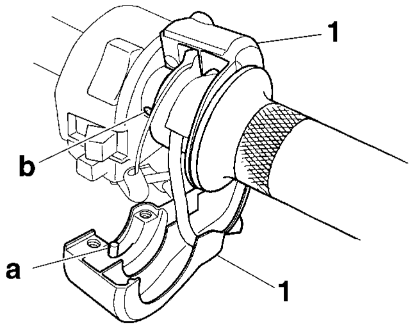
First tighten the bolts, then tighten the nuts.

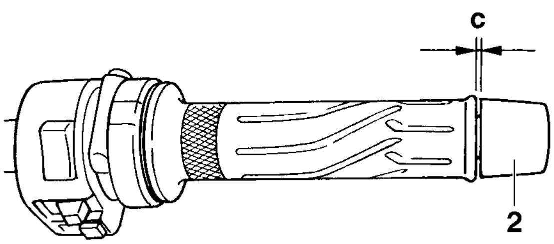
9. Install:
   - Throttle grip
   - Throttle cables
   - Throttle cable housing “1”
   - Grip end “2”

TIP

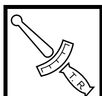
- Route the right grip warmer lead “3” through the throttle cable housing so that it forms a loop as shown in the illustration. Make sure that the loop is formed so that the section of the lead from the handlebar grip to the first molded grommet is routed above the section which exits the throttle cable housing.
- When installing the throttle cable housing, align the projection “a” on the housing with the hole “b” in the right handlebar and be sure not to pinch the right grip warmer lead.
- There should be 1–3 mm (0.04–0.12 in) of clearance “c” between the throttle grip and the grip end.







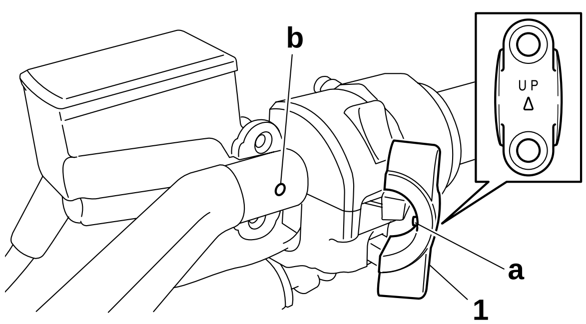
10.Install:
- Front brake master cylinder assembly
- Front brake master cylinder holder “1”



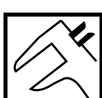
Front brake master cylinder holder bolt
10 Nm (1.0 m·kg, 7.2 ft·lb)

TIP

- Install the brake master cylinder holder with the “UP” mark facing up.
- Align the projection “a” on the front brake master cylinder with hole “b” on the right handlebar.
- First, tighten the upper bolt, then the lower bolt.



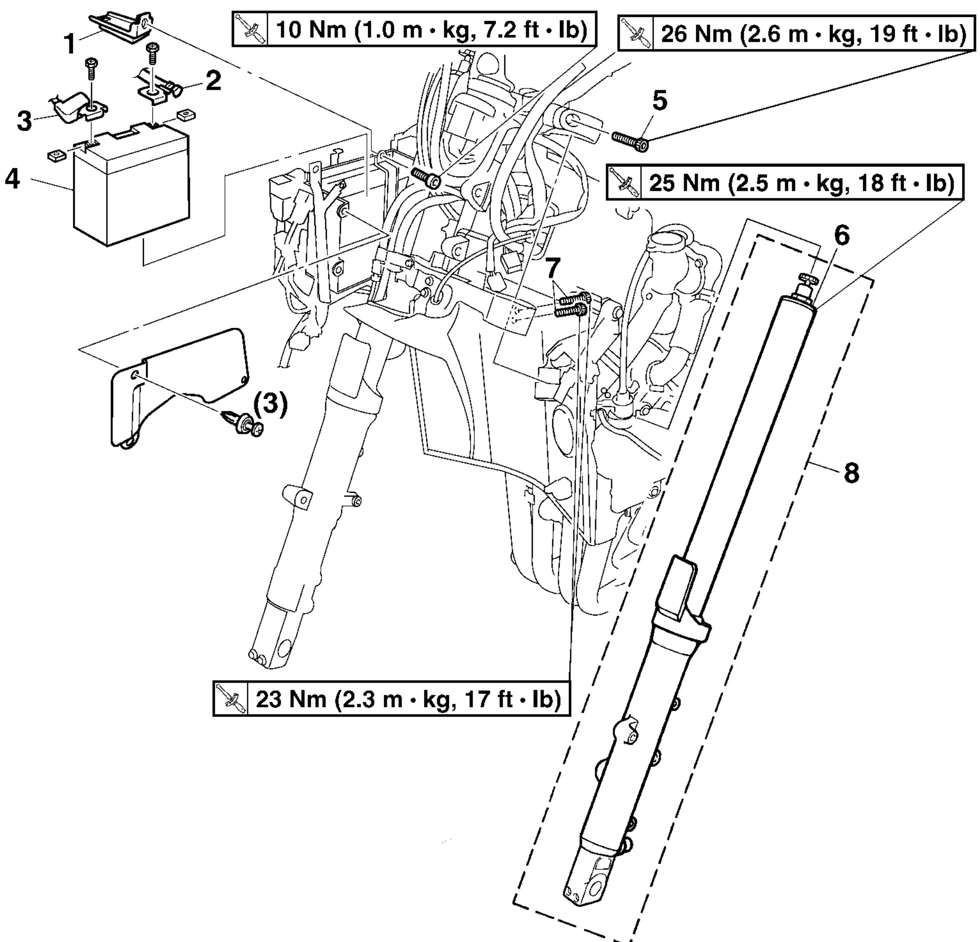
11.Adjust:
- Throttle cable free play
  Refer to “ADJUSTING THE THROTTLE CABLE FREE PLAY” on page 3-10.



Throttle cable free play
3.0–5.0 mm (0.12–0.20 in)

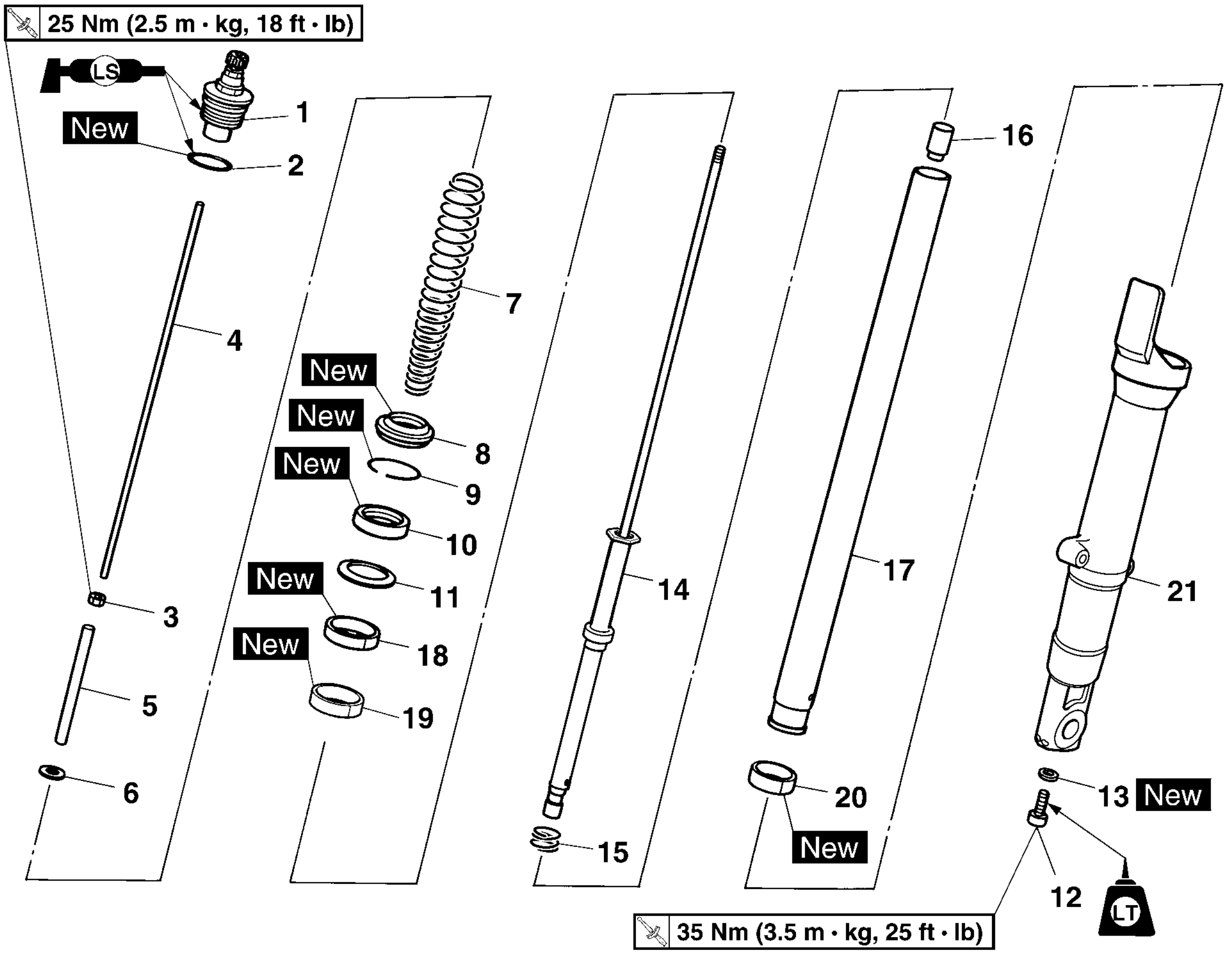
EAS22950
FRONT FORK

Removing the front fork legs



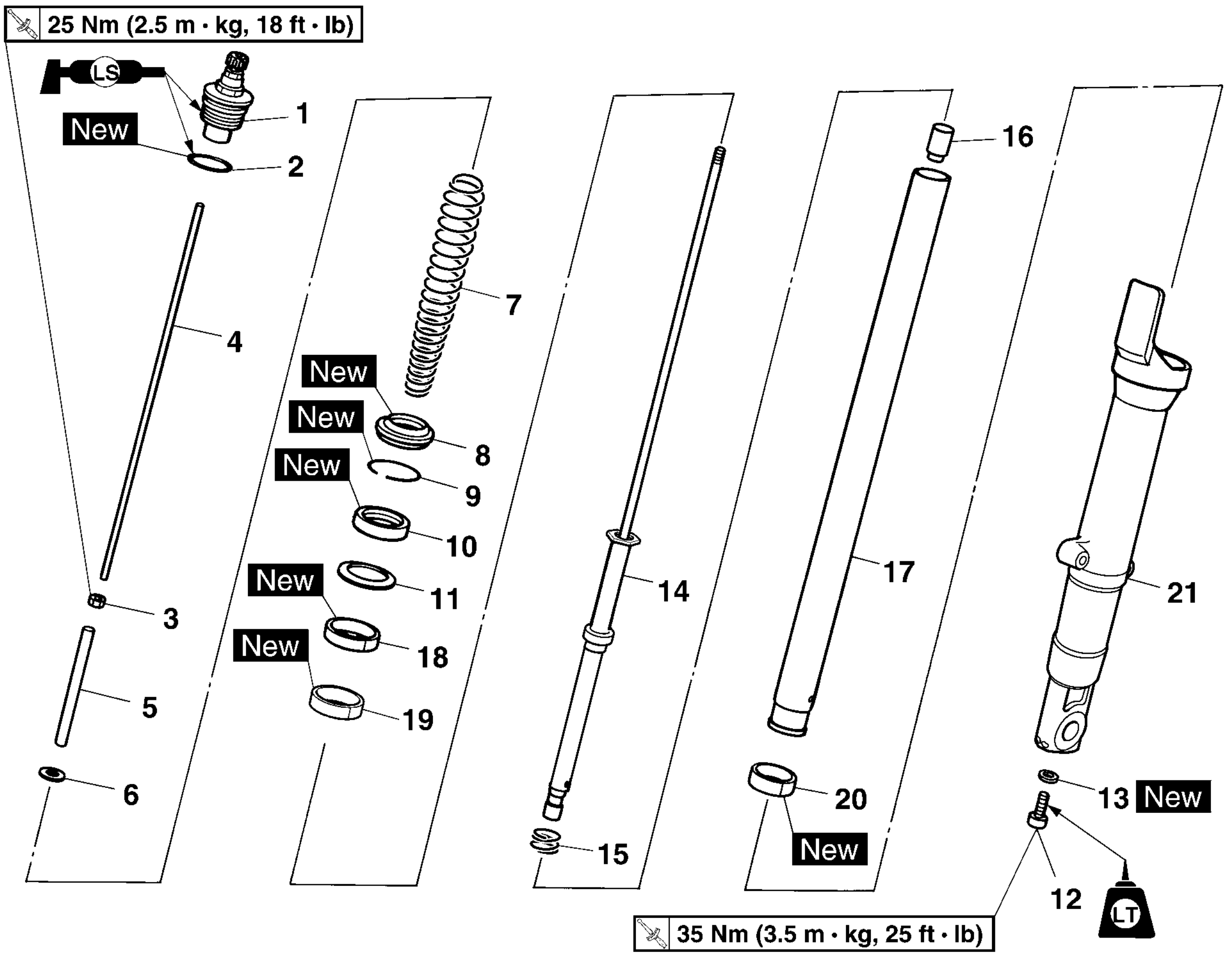
Order	Job/Parts to remove	Q'ty	Remarks
			The following procedure applies to both of the front fork legs.
	Front cowling assembly		Refer to "GENERAL CHASSIS" on page 4-1.
	Front wheel		Refer to "FRONT WHEEL" on page 4-17.
1	Battery holder	1	
2	Negative battery lead	1	Disconnect.
3	Positive battery lead	1	Disconnect.
4	Battery	1	
5	Upper bracket pinch bolt	1	Loosen.
6	Cap bolt	1	Loosen.
7	Lower bracket pinch bolt	2	Loosen.
8	Front fork leg	1	
			For installation, reverse the removal procedure.

Disassembling the front fork legs



Order	Job/Parts to remove	Q’ty	Remarks
			The following procedure applies to both of the front fork legs.
1	Cap bolt	1	
2	O-ring	1	
3	Nut	1	
4	Damper adjusting rod	1	
5	Spacer	1	
6	Washer	1	
7	Fork spring	1	
8	Dust seal	1	
9	Oil seal clip	1	
10	Oil seal	1	
11	Washer	1	
12	Damper rod assembly bolt	1	
13	Copper washer	1	
14	Damper rod assembly	1	
15	Spring	1	
16	Oil flow stopper	1	

Disassembling the front fork legs



Order	Job/Parts to remove	Q'ty	Remarks
17	Inner tube	1	
18	Outer tube bushing 1	1	D = 52 mm (2.05 in), l = 12 mm (0.47 in)
19	Outer tube bushing 2	1	D = 51 mm (2.01 in), l = 15 mm (0.59 in)
20	Inner tube bushing	1	
21	Outer tube	1	
			For assembly, reverse the disassembly procedure.

EAS22960

REMOVING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

1. Stand the vehicle on a level surface.

EWA13120

WARNING

Securely support the vehicle so that there is no danger of it falling over.

TIP

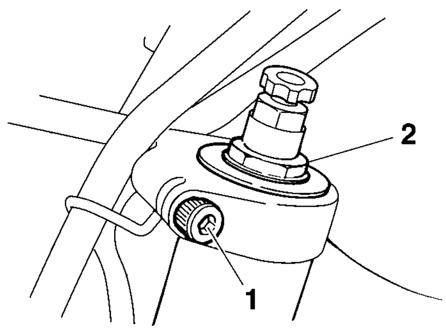
Place the vehicle on a suitable stand so that the front wheel is elevated.

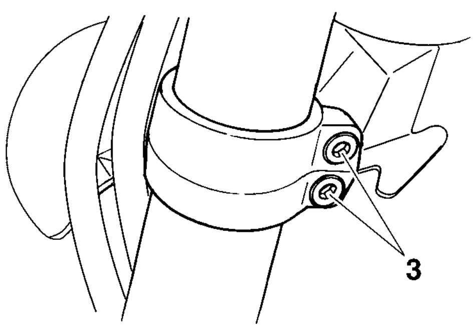
2. Loosen:
   - Upper bracket pinch bolt “1”
   - Cap bolt “2”
   - Lower bracket pinch bolts “3”

EWA13640

WARNING

Before loosening the upper and lower bracket pinch bolts, support the front fork leg.



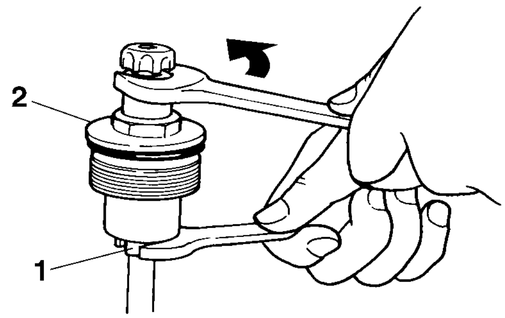


EAS22980

DISASSEMBLING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

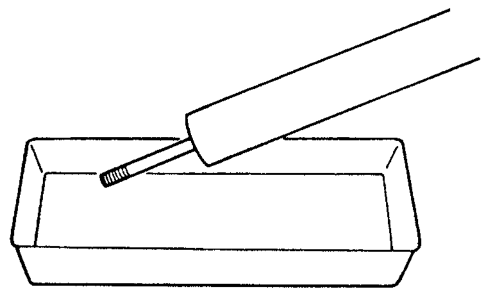
1. Hold the nut “1” and loosen the cap bolt “2”.



2. Drain:
   - Fork oil

TIP

Stroke the inner tube several times while draining the fork oil.



3. Remove:
   - Dust seal “1”
   - Oil seal clip “2”
     (with a flat-head screwdriver)

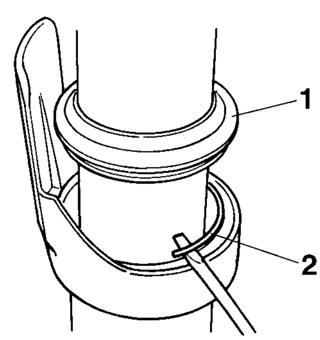
ECA14180

NOTICE

Do not scratch the inner tube.

TIP

- Do not remove the fork leg protector from the outer tube.
- If the front fork leg protector must be removed, always install a new one.



4. Remove:
   - Oil seal
   - Washer

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Pull up the inner tube completely, fill it with oil up to the top, and then install the cap bolt.

TIP

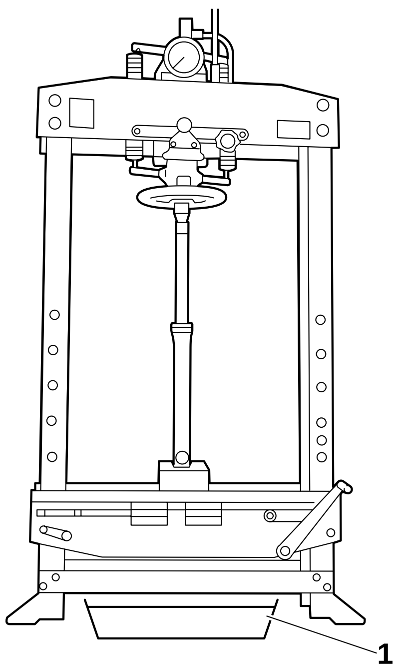
Do not install the fork spring.

b. Place the front fork leg in a press and gradually apply pressure to remove the oil seal.

EC3P61026

NOTICE

- **Be careful not to damage the top of the cap bolt.**
- **Place an oil drain pan under the press before applying pressure to the front fork leg.**
- **Stop applying pressure when oil begins to leak from between the oil seal and the outer tube.**



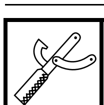
1. Oil drain pan

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

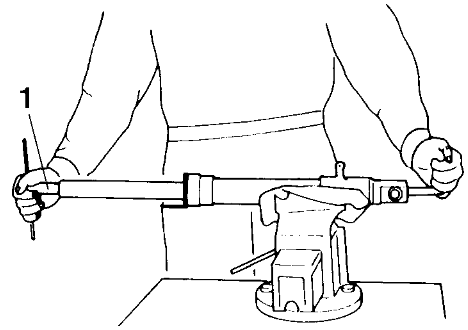
5. Remove:
   - Damper rod assembly bolt
   - Copper washer

TIP

While holding the damper rod assembly with the damper rod holder “1”, loosen the damper rod assembly bolt.



Damper rod holder
90890-01447
YM-01447



6. Remove:
   - Inner tube

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Hold the front fork leg horizontally.

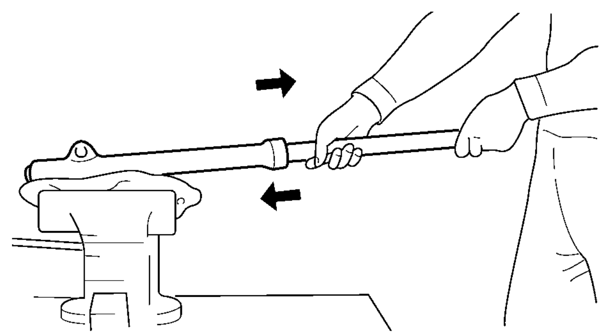
b. Securely clamp the brake caliper bracket in a vise with soft jaws.

c. Separate the inner tube from the outer tube by pulling the inner tube forcefully but carefully.

EC3P61027

NOTICE

- **Excessive force will damage the bushings. Damaged bushings must be replaced.**
- **Avoid bottoming the inner tube into the outer tube during the above procedure, as the oil flow stopper will be damaged.**



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EAS23010

CHECKING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

1. Check:
   - Inner tube
   - Outer tube

   Bends/damage/scratches → Replace.

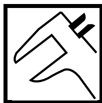
EWA13650

⚠ WARNING

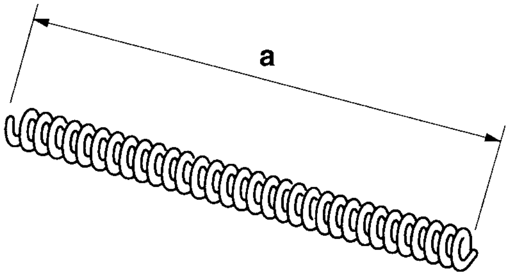
Do not attempt to straighten a bent inner tube as this may dangerously weaken it.

2. Measure:
   - Spring free length “a”

   Out of specification → Replace.



Fork spring free length
262.0 mm (10.31 in)
Limit
257.0 mm (10.12 in)



3. Check:
   - Damper rod assembly
     Damage/wear → Replace.
     Obstruction → Blow out all of the oil passages with compressed air.
   - Oil flow stopper
     Damage → Replace.

ECA14200

NOTICE

- **The front fork leg has a built-in damper adjusting rod and a very sophisticated internal construction, which are particularly sensitive to foreign material.**
- **When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.**

4. Check:
   - Cap bolt O-ring
     Damage/wear → Replace.

EAS23030

ASSEMBLING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

EWA13660

⚠ WARNING

- **Make sure the oil levels in both front fork legs are equal.**
- **Uneven oil levels can result in poor handling and a loss of stability.**

TIP

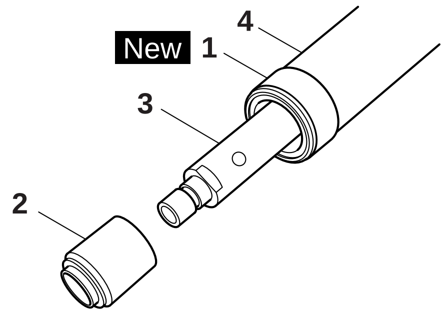
- When assembling the front fork leg, be sure to replace the following parts:
  - Inner tube bushing
  - Outer tube bushing 1
  - Outer tube bushing 2
  - Oil seal
  - Dust seal
- Before assembling the front fork leg, make sure all of the components are clean.

1. Install:
   - Inner tube bushing “1” New
   - Oil flow stopper “2”
   - Spring
   - Damper rod assembly “3”

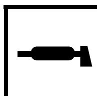
EC3P61028

NOTICE

Allow the damper rod assembly to slide slowly down the inner tube “4” until it protrudes from the bottom of the inner tube. Be careful not to damage the inner tube.

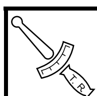


2. Lubricate:
   - Inner tube’s outer surface



Recommended oil
Ohlins R & T43 (ACC-RT43F-00-00)

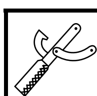
3. Tighten:
   - Damper rod assembly bolt



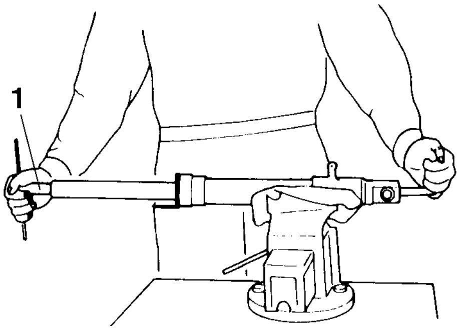
Damper rod assembly bolt
35 Nm (3.5 m·kg, 25 ft·lb)
LOCTITE®

TIP

While holding the damper rod assembly with the damper rod holder “1”, tighten the damper rod assembly bolt.

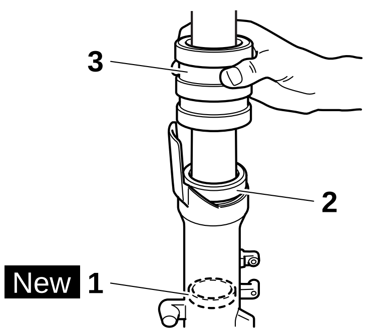


Damper rod holder
90890-01447
YM-01447



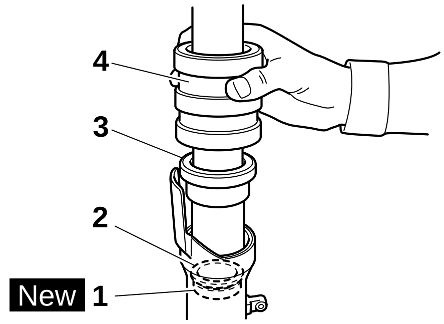
4. Install:
   - Outer tube bushing 2 (D = 51 mm (2.01 in), l = 15 mm (0.59 in)) “1” **New**
     (with the slide metal installer “2” and fork seal driver “3”)

Slide metal installer **90890-01508** **YM-01508** **Fork seal driver** **90890-01502** **YM-A0948**



5. Install:
   - Outer tube bushing 1 (D = 52 mm (2.05 in), l = 12 mm (0.47 in)) “1” **New**
   - Washer “2”
     (with the slide metal installer “3” and fork seal driver (weight) “4”)

Slide metal installer **90890-01508** **YM-01508** **Fork seal driver** **90890-01502** **YM-A0948**



6. Install:
   - Oil seal “1” **New**
   - Suitable washer “2” (ex: 4SV-23115-00)
     (with the slide metal installer “3” and fork seal driver (weight) “4”)

Slide metal installer **90890-01508** **YM-01508** **Fork seal driver** **90890-01502** **YM-A0948**

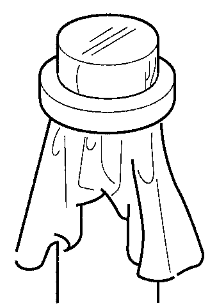
ECA14220

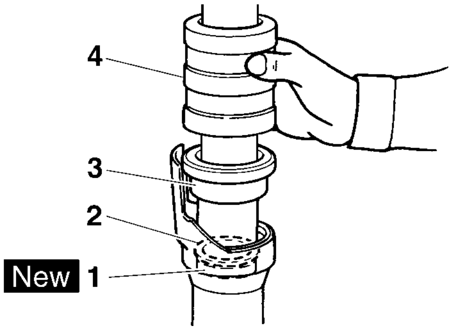
NOTICE

Make sure the numbered side of the oil seal faces up.

TIP

- Before installing the oil seal, lubricate its lips with lithium-soap-based grease.
- Lubricate the outer surface of the inner tube with fork oil.
- Before installing the oil seal, cover the top of the front fork leg with a plastic bag to protect the oil seal during installation.

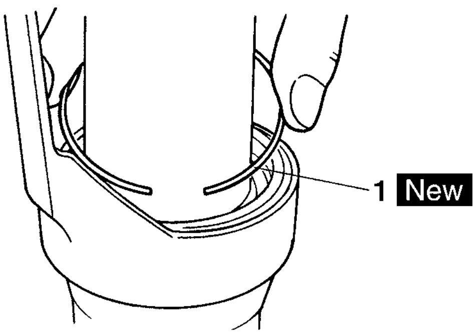




7. Remove:
   - Suitable washer
8. Install:
   - Oil seal clip “1” New

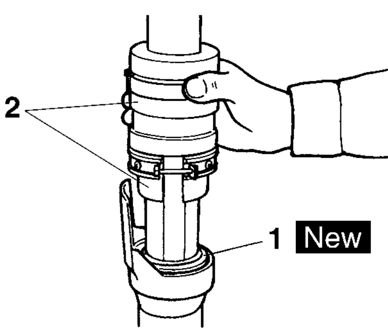
TIP

Adjust the oil seal clip so that it fits into the outer tube’s groove.



9. Install:
   - Dust seal “1” New
     (with the fork seal driver “2”)

Fork seal driver
90890-01502
YM-A0948



10. Fill:
    - Front fork leg
      (with the specified amount of the recommended fork oil)

Recommended oil
Ohlins R & T43 (ACC-RT43F-00-00)
Quantity
696.0 cm³ (23.53 US oz) (24.55 Imp.oz)

ECA14230

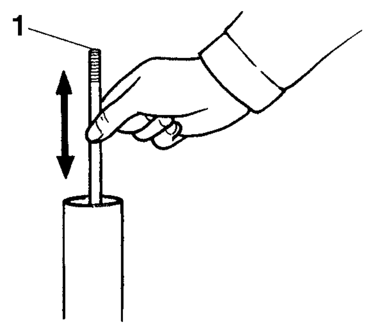
NOTICE

- **Be sure to use the recommended fork oil. Other oils may have an adverse effect on front fork performance.**
- **When disassembling and assembling the front fork leg, do not allow any foreign material to enter the front fork.**

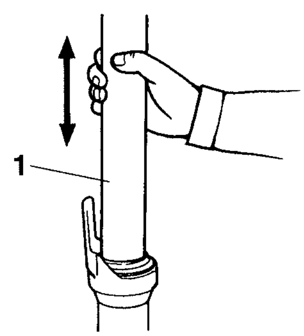
11. After filling the front fork leg, slowly stroke the damper rod assembly “1” up and down (at least ten times) to distribute the fork oil.

TIP

Be sure to stroke the damper rod assembly slowly because the fork oil may spurt out.



12. Slowly stroke the inner tube “1” up and down.



13. Before measuring the fork oil level, wait ten minutes until the oil has settled and the air bubbles have dispersed.

TIP

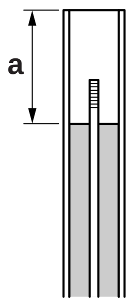
Be sure to bleed the front fork leg of any residual air.

14.Measure:
- Front fork leg oil level “a”
  (from the top of the inner tube, with the outer tube fully compressed and without the fork spring)
  Out of specification → Correct.

Level
92.0 mm (3.62 in)

TIP

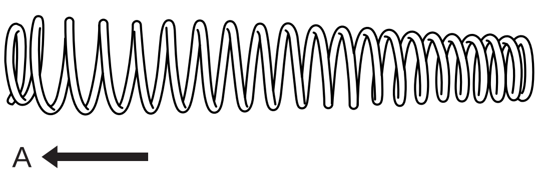
- While filling the front fork leg, keep it upright.
- After filling, slowly pump the front fork leg up and down to distribute the fork oil.



15.Install:
- Fork spring

TIP

Install the fork spring so that the end “A” shown in the illustration is facing up.



16.Install:
- Nut “1”
- Damper adjusting rod “2”
- Cap bolt “3”

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a. Install the nut “1” and finger tighten it.
b. Install the damper adjusting rod “2”.
c. Install the cap bolt “3” and finger tighten it.

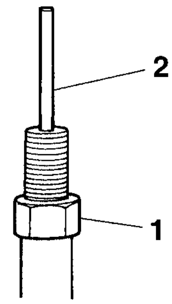
EWA13670

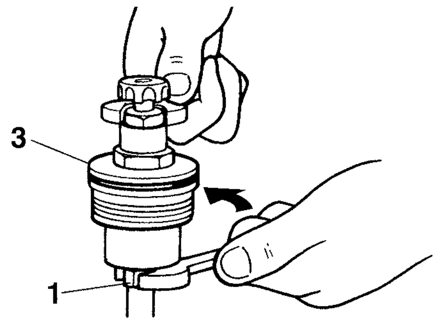
⚠ WARNING

Always use a new cap bolt O-ring.

d. Hold the cap bolt and tighten the nut “1” to specification.

Nut
25 Nm (2.5 m·kg, 18 ft·lb)





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17.Install:
- Cap bolt
  (to the outer tube)

TIP

Temporarily tighten the cap bolt.

EAS23050

INSTALLING THE FRONT FORK LEGS

The following procedure applies to both of the front fork legs.

1. Install:
   - Front fork leg
     Temporarily tighten the upper and lower bracket pinch bolts.

TIP

Make sure the inner tube is flush with the top of the upper bracket.

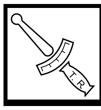
2. Tighten:
   - Lower bracket pinch bolts “1”

Lower bracket pinch bolt
23 Nm (2.3 m·kg, 17 ft·lb)

   - Cap bolt “2”

Cap bolt
25 Nm (2.5 m·kg, 18 ft·lb)

- Upper bracket pinch bolt “3”

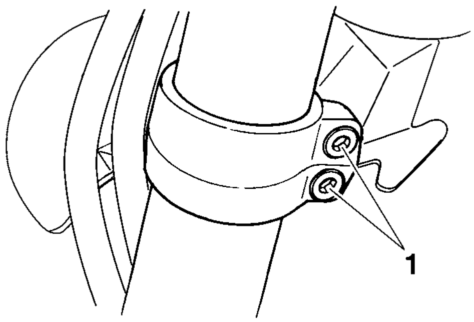


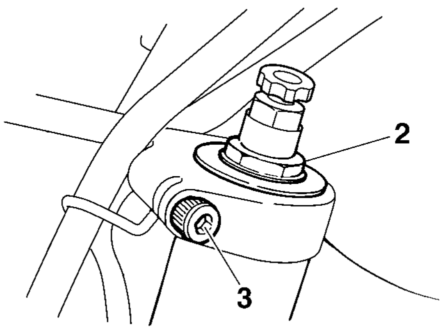
	Upper bracket pinch bolt **26 Nm (2.6 m·kg, 19 ft·lb)**

EWA13680

WARNING

Make sure the brake hoses are routed properly.



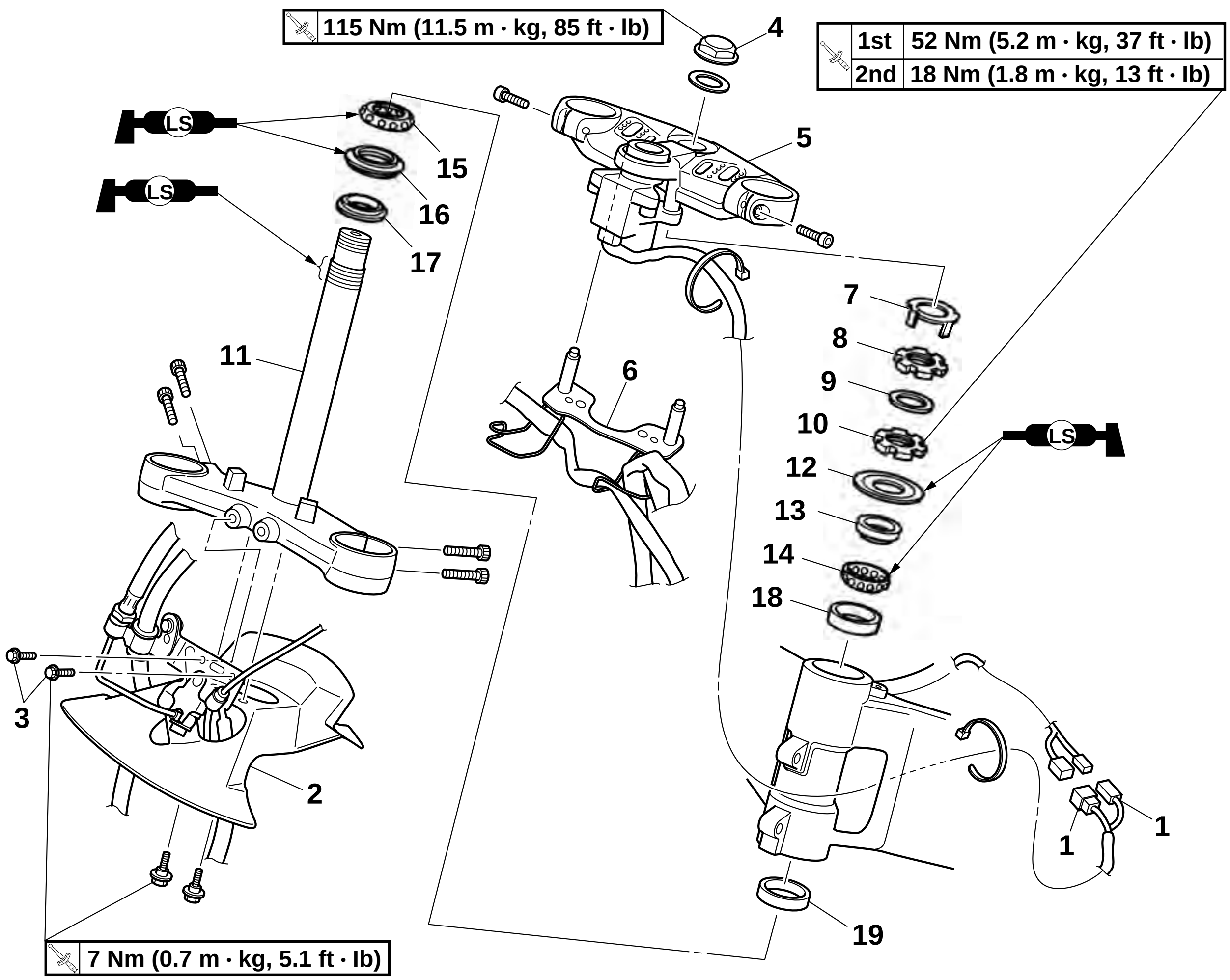


3. Adjust:
   - Spring preload
   - Rebound damping
   - Compression damping
     Refer to “ADJUSTING THE FRONT FORK LEGS” on page 3-36.

EAS23090

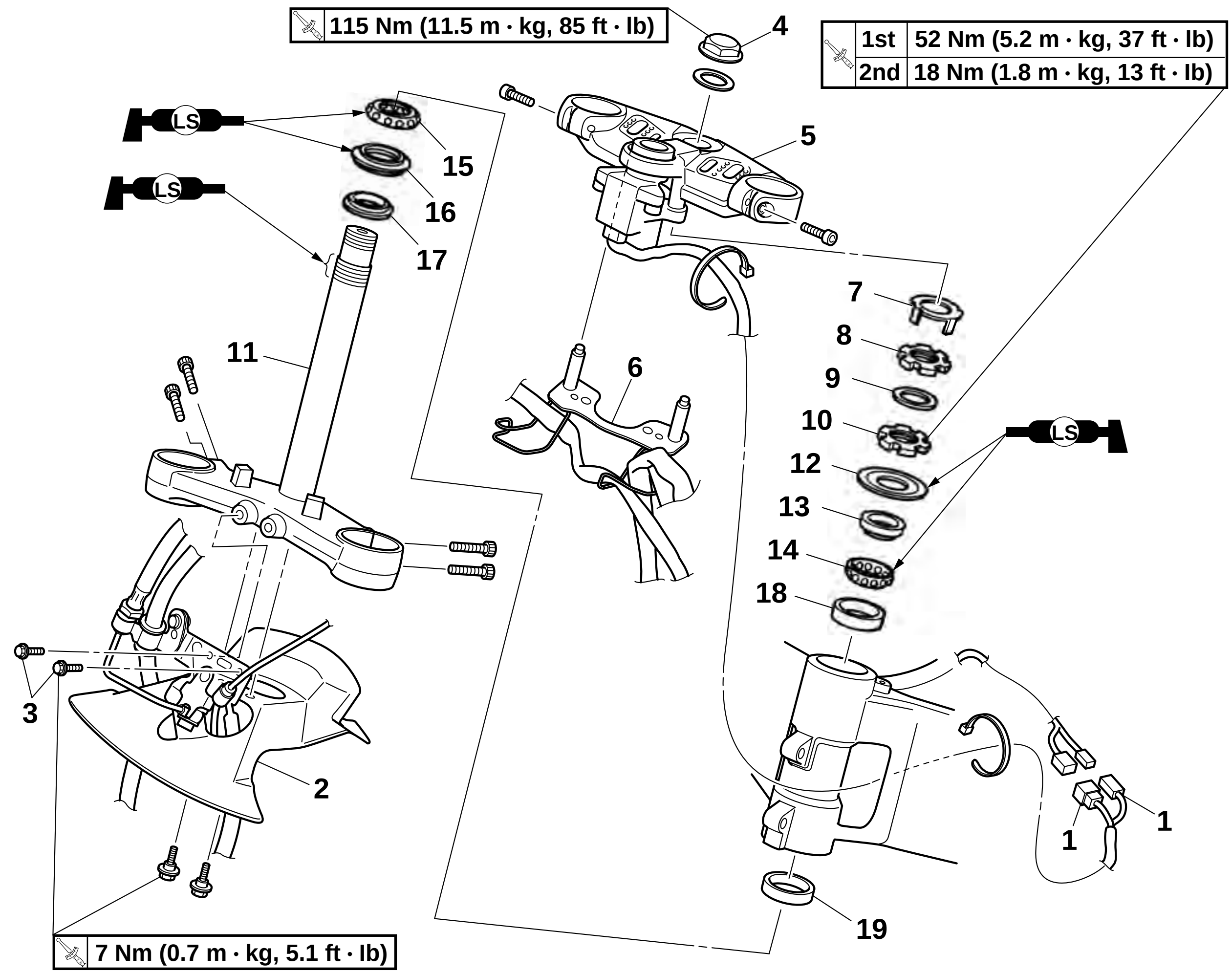
STEERING HEAD

Removing the lower bracket



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat/T-bar		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Handlebars		Refer to "HANDLEBARS" on page 4-70.
	Front fork legs		Refer to "FRONT FORK" on page 4-79.
1	Main switch coupler	2	Disconnect.
2	Lower bracket cover	1	
3	Brake hose joint bracket bolt	2	
4	Steering stem nut	1	
5	Upper bracket	1	
6	Handlebar bracket	1	
7	Lock washer	1	
8	Upper ring nut	1	
9	Rubber washer	1	
10	Lower ring nut	1	
11	Lower bracket	1	

Removing the lower bracket



Order	Job/Parts to remove	Q'ty	Remarks
12	Upper bearing cover	1	
13	Upper bearing inner race	1	
14	Upper bearing	1	
15	Lower bearing	1	
16	Dust seal	1	
17	Lower bearing inner race	1	
18	Upper bearing outer race	1	
19	Lower bearing outer race	1	
			For installation, reverse the removal procedure.

EAS23110

REMOVING THE LOWER BRACKET

1. Stand the vehicle on a level surface.

EWA13120

WARNING

Securely support the vehicle so that there is no danger of it falling over.

2. Remove:
   - Upper ring nut
   - Rubber washer
   - Lower ring nut “1”
   - Lower bracket

EWA13730

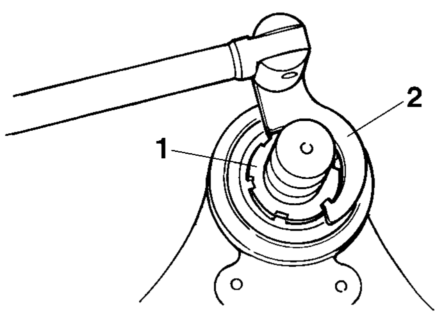
WARNING

Securely support the lower bracket so that there is no danger of it falling.

TIP

Remove the lower ring nut with the steering nut wrench “2”.

Steering nut wrench
90890-01403
Exhaust flange nut wrench
YU-A9472



EAS23120

CHECKING THE STEERING HEAD

1. Wash:
   - Bearings
   - Bearing races

Recommended cleaning solvent
Kerosene

2. Check:
   - Bearings
   - Bearing races

   Damage/pitting → Replace.
3. Replace:
   - Bearings
   - Bearing races

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a. Remove the bearing races from the steering head pipe “1” with a long rod “2” and hammer.

b. Remove the bearing race from the lower bracket “3” with a floor chisel “4” and hammer.

c. Install new bearing races.

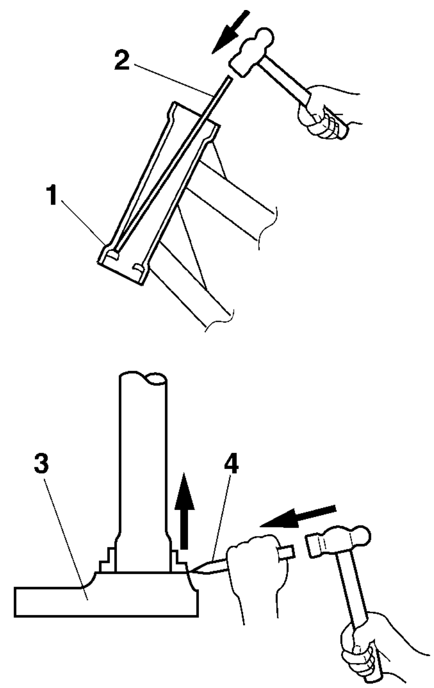
ECA14270

NOTICE

If the bearing race is not installed properly, the steering head pipe could be damaged.

TIP

Always replace the bearings and bearing races as a set.



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4. Check:
   - Upper bracket
   - Lower bracket

   (along with the steering stem)
   Bends/cracks/damage → Replace.

EAS23140

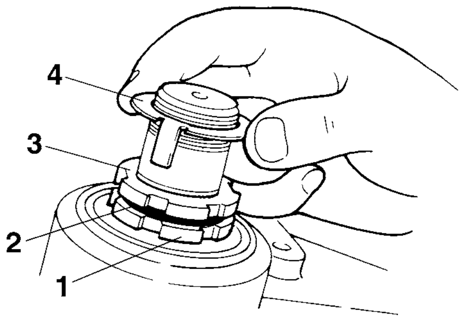
INSTALLING THE STEERING HEAD

1. Lubricate:
   - Upper bearing
   - Lower bearing
   - Bearing races

Recommended lubricant
Lithium-soap-based grease

2. Install:
   - Lower ring nut “1”
   - Rubber washer “2”
   - Upper ring nut “3”

- Lock washer “4”
  Refer to “CHECKING AND ADJUSTING THE STEERING HEAD” on page 3-33.



3. Install:
   - Upper bracket
   - Steering stem nut

TIP

Temporarily tighten the steering stem nut.

4. Install:
   - Front fork legs
     Refer to “FRONT FORK” on page 4-79.

TIP

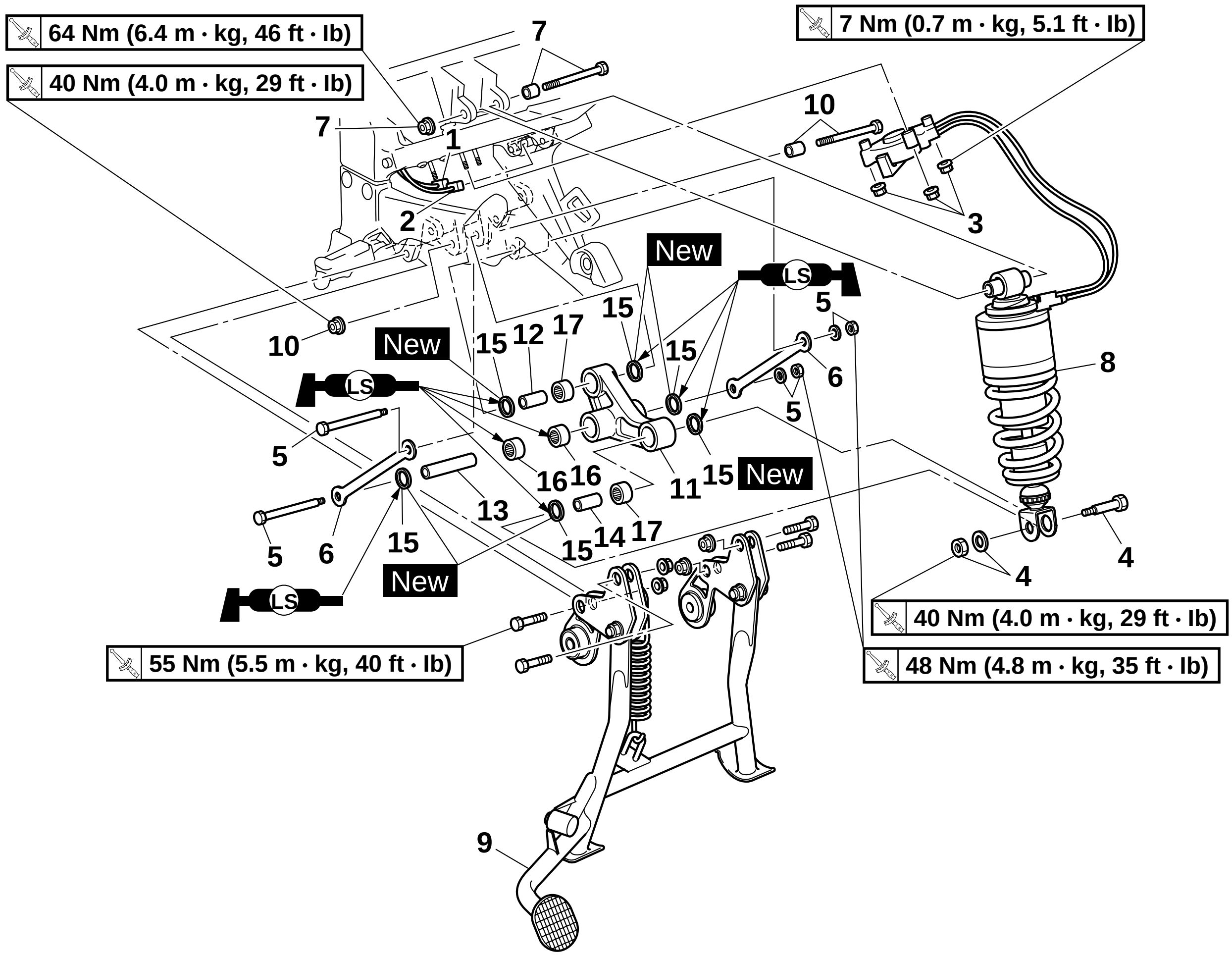
Temporarily tighten the upper and lower bracket pinch bolts.

5. Tighten:
   - Steering stem nut

T. R.	**Steering stem nut** **115 Nm (11.5 m·kg, 85 ft·lb)**

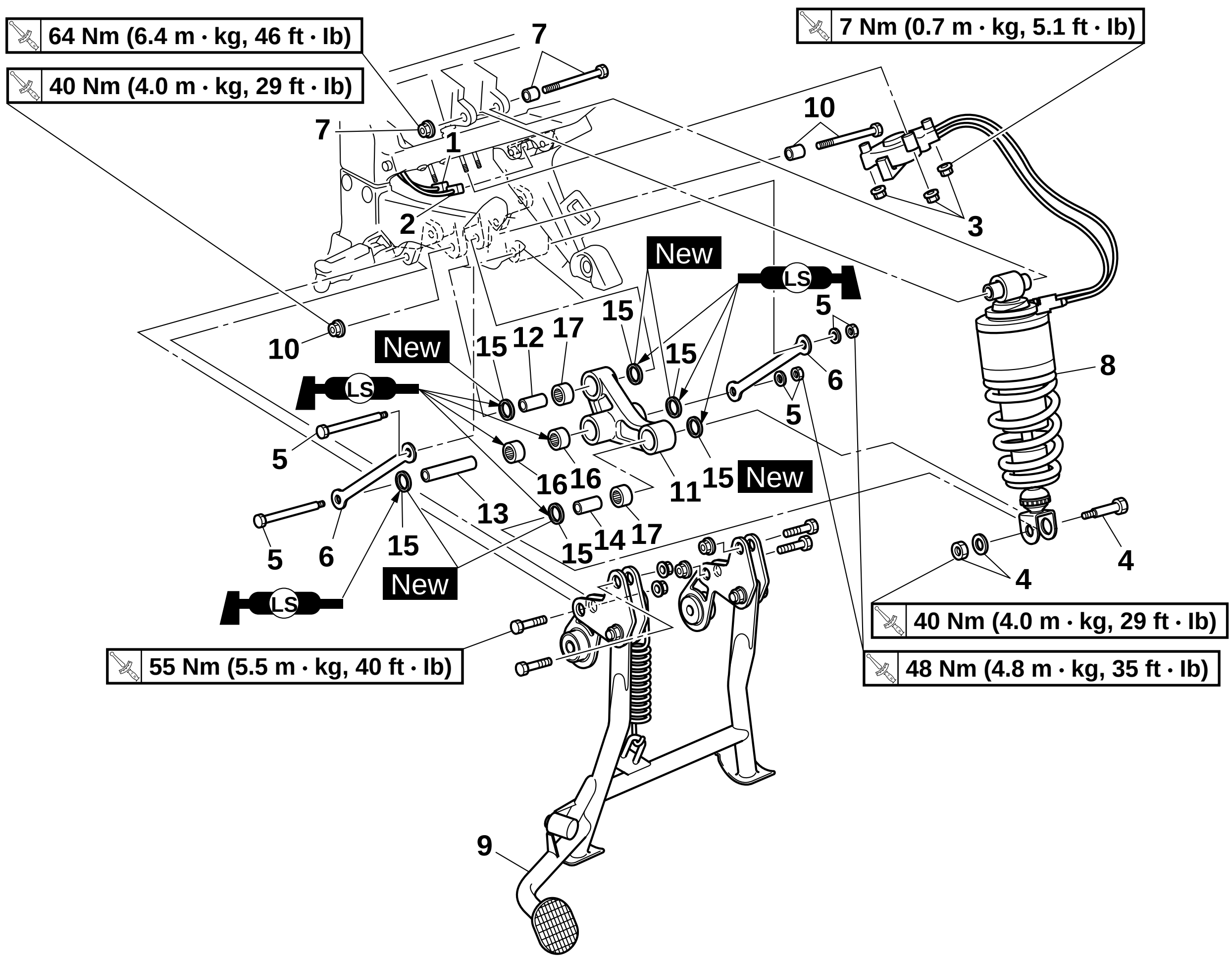
EAS23160
REAR SHOCK ABSORBER ASSEMBLY

Removing the rear shock absorber assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Rear wheel		Refer to "REAR WHEEL" on page 4-25.
	Mufflers/Exhaust pipe assembly		Refer to "ENGINE REMOVAL" on page 5-1.
1	Rectifier/regulator coupler	1	Disconnect.
2	Stator coil coupler	1	Disconnect.
3	Rear shock absorber spring preload adjusting lever nut	3	
4	Rear shock absorber assembly lower nut/Washer/Bolt	1/1/1	
5	Connecting arm nut/Washer/Bolt	2/2/2	
6	Connecting arm	2	
7	Rear shock absorber assembly upper nut/Bolt/Spacer	1/1/1	
8	Rear shock absorber assembly	1	
9	Centerstand	1	
10	Relay arm nut/Bolt/Spacer	1/1/1	

Removing the rear shock absorber assembly



Order	Job/Parts to remove	Q'ty	Remarks
11	Relay arm	1	
12	Spacer	1	
13	Spacer	1	
14	Spacer	1	
15	Oil seal	6	
16	Bearing	2	
17	Bearing	2	
			For installation, reverse the removal procedure.

EAS23180

HANDLING THE REAR SHOCK ABSORBER

EWA13740

WARNING

This rear shock absorber contains highly compressed nitrogen gas. Before handling the rear shock absorber, read and make sure you understand the following information. The manufacturer cannot be held responsible for property damage or personal injury that may result from improper handling of the rear shock absorber.

- **Do not tamper or attempt to open the rear shock absorber.**
- **Do not subject the rear shock absorber to an open flame or any other source of high heat. High heat can cause an explosion due to excessive gas pressure.**
- **Do not deform or damage the rear shock absorber in any way. Rear shock absorber damage will result in poor damping performance.**

EAS23190

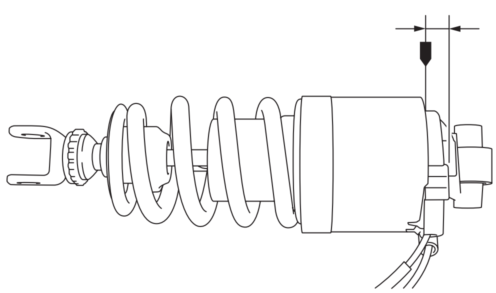
DISPOSING OF A REAR SHOCK ABSORBER

1. Gas pressure must be released before disposing of a rear shock absorber. To release the gas pressure, drill a 2–3 mm (0.08–0.12 in) hole through the rear shock absorber at a point 15–20 mm (0.59–0.79 in) from its end as shown.

EWA13760

WARNING

Wear eye protection to prevent eye damage from released gas or metal chips.



EAS23230

REMOVING THE REAR SHOCK ABSORBER ASSEMBLY

1. Stand the vehicle on a level surface.

EWA13120

WARNING

Securely support the vehicle so that there is no danger of it falling over.

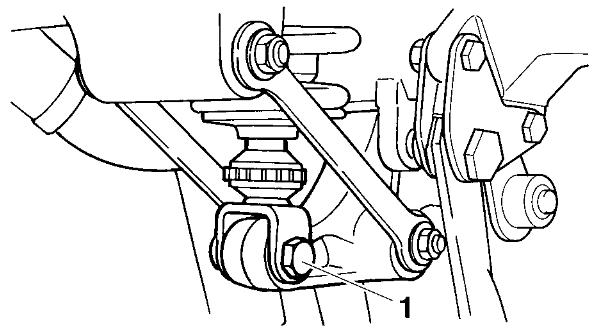
TIP

Place the vehicle on a suitable stand so that the rear wheel is elevated.

2. Remove:
   - Rear shock absorber assembly lower bolt “1”
   - Connecting arms

TIP

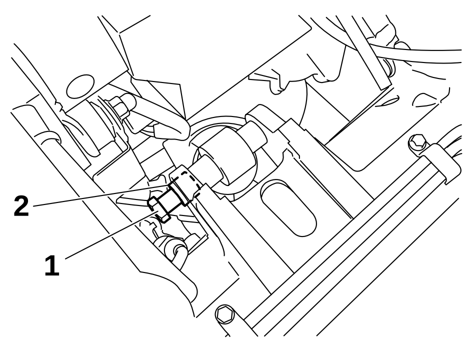
While removing the connecting arm bolts, hold the swingarm so that it does not drop down.



3. Remove:
   - Rear shock absorber assembly upper bolt “1”
   - Spacer “2”
   - Rear shock absorber assembly

TIP

- Partially pull out the rear shock absorber assembly upper bolt, slide the spacer “1” towards the bolt head to create some clearance between the bolt and the frame, and then remove the bolt completely.
- Raise the swingarm and then remove the rear shock absorber assembly from between the swingarm and relay arm.



EAS23240

CHECKING THE REAR SHOCK ABSORBER ASSEMBLY

1. Check:
   - Rear shock absorber rod
     Bends/damage → Replace the rear shock absorber assembly.

- Rear shock absorber
  Gas leaks/oil leaks → Replace the rear shock absorber assembly.
- Spring
  Damage/wear → Replace the rear shock absorber assembly.
- Bushing
  Damage/wear → Replace the rear shock absorber assembly.
- Spacer
  Damage/scratches → Replace.
- Bolts
  Bends/damage/wear → Replace.

EAS23260
CHECKING THE CONNECTING ARM AND RELAY ARM

1. Check:
   - Connecting arms
   - Relay arm
   Damage/wear → Replace.
2. Check:
   - Bearings
   - Oil seals
   Damage/pitting → Replace.
3. Check:
   - Spacers
   Damage/scratches → Replace.

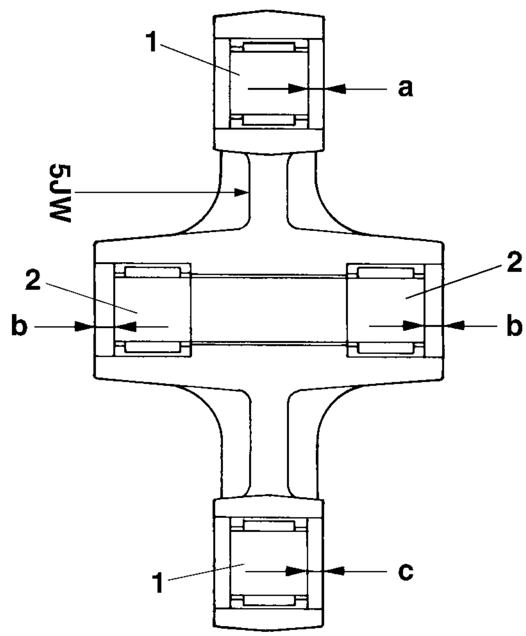
EAS23270
INSTALLING THE RELAY ARM

1. Lubricate:
   - Spacer
   - Bearings

Recommended lubricant
Lithium-soap-based grease

2. Install:
   - Bearing “1”, “2”
   (to the relay arm)

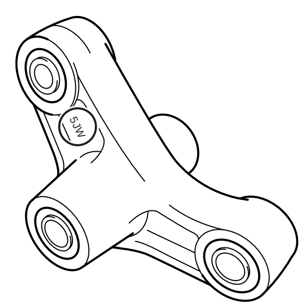
Installed depth “a”
4.5 mm (0.18 in)
Installed depth “b”
3.5–4.5 mm (0.14–0.18 in)
Installed depth “c”
4.0 mm (0.16 in)



3. Install:
   - Relay arm

TIP

Make sure that the embossed mark “5JW” on the relay arm faces to the left.



EAS23310
INSTALLING THE REAR SHOCK ABSORBER ASSEMBLY

1. Install:
   - Rear shock absorber assembly

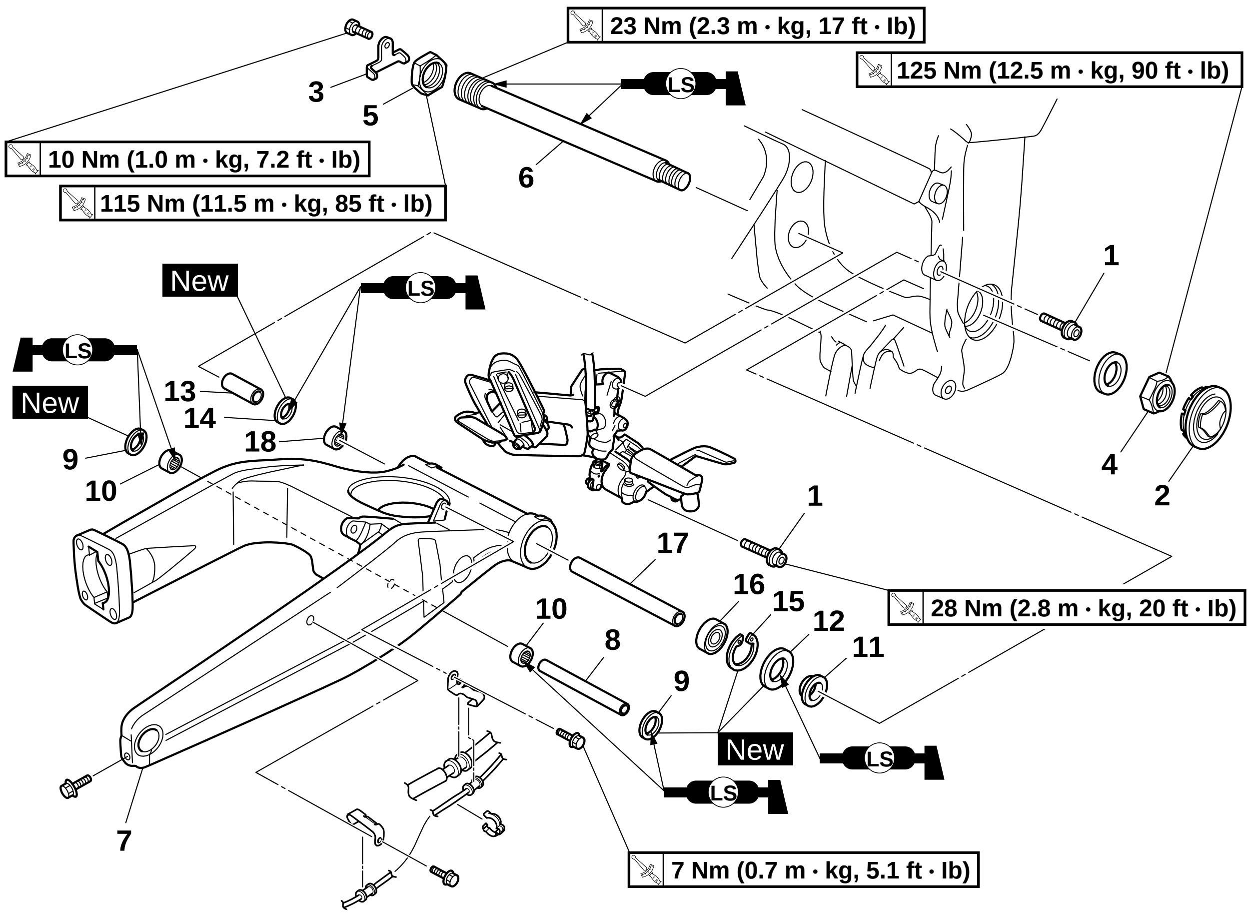
TIP

- Make sure that the warning label on the rear shock absorber assembly faces to the right.
- When installing the rear shock absorber assembly, lift up the swingarm.

EAS23330

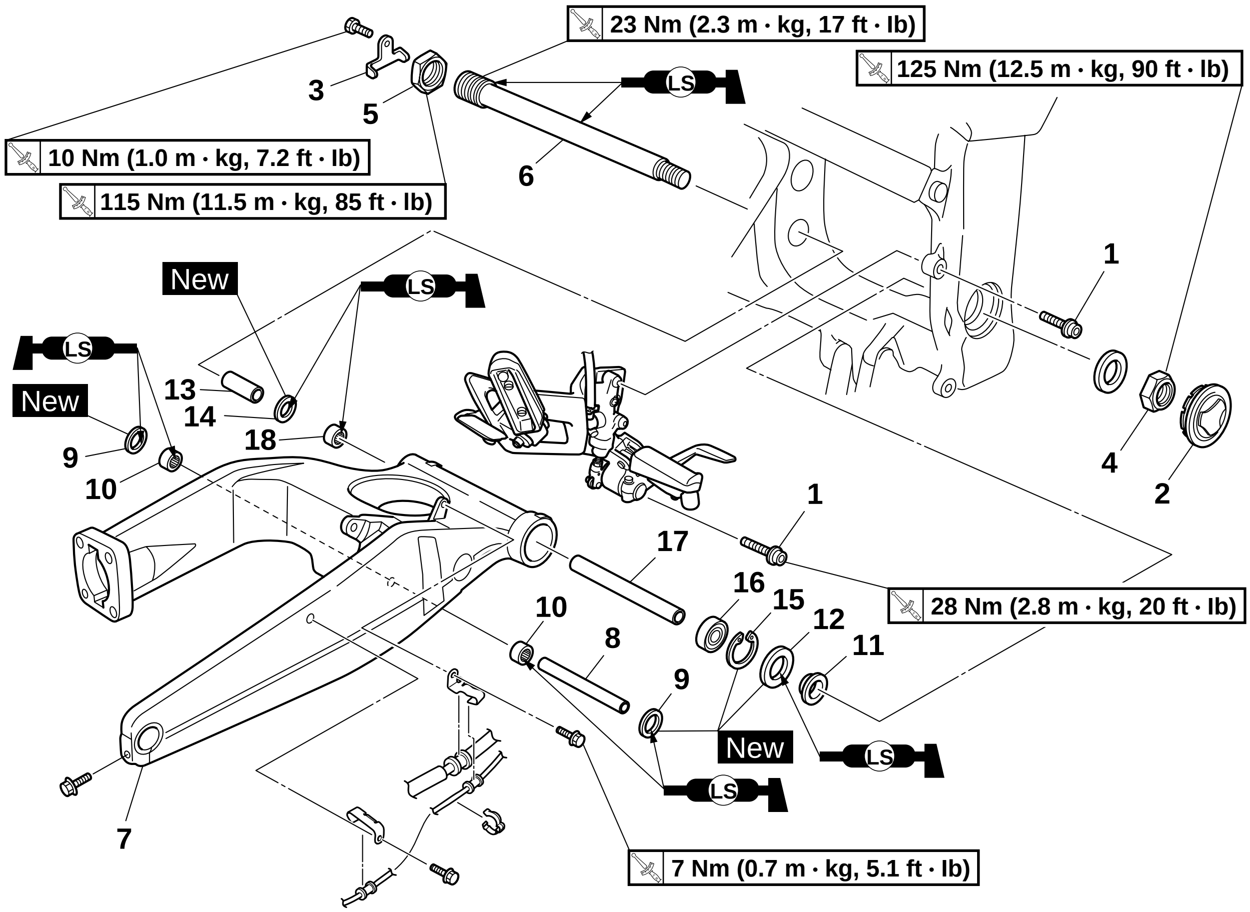
SWINGARM

Removing the swingarm



Order	Job/Parts to remove	Q'ty	Remarks
	Rear wheel		Refer to "REAR WHEEL" on page 4-25.
	Rear shock absorber assembly/Connecting arms		Refer to "REAR SHOCK ABSORBER ASSEMBLY" on page 4-93.
	Final drive assembly/Universal joint		Refer to "SHAFT DRIVE" on page 4-101.
1	Right footrest bracket bolt	2	
2	Pivot shaft end cover	1	
3	Pivot shaft locknut retainer	1	
4	Pivot shaft nut	1	
5	Pivot shaft locknut	1	
6	Pivot shaft	1	
7	Swingarm	1	
8	Spacer	1	
9	Oil seal	2	
10	Bearing	2	
11	Collar	1	
12	Oil seal	1	

Removing the swingarm



Order	Job/Parts to remove	Q'ty	Remarks
13	Spacer	1	
14	Oil seal	1	
15	Circlip	1	
16	Bearing	1	
17	Spacer	1	
18	Bearing	1	
			For installation, reverse the removal procedure.

EAS23350

REMOVING THE SWINGARM

1. Stand the vehicle on a level surface.

EWA13120

WARNING

Securely support the vehicle so that there is no danger of it falling over.

TIP

Place the vehicle on a suitable stand so that the rear wheel is elevated.

2. Measure:
   - Swingarm side play
   - Swingarm vertical movement

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a. Measure the tightening torque of the pivot shaft, pivot shaft nut, and pivot shaft locknut.

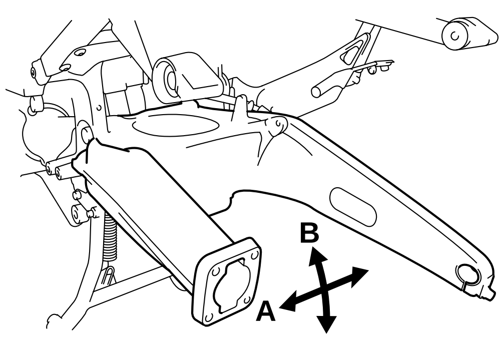
Pivot shaft
23 Nm (2.3 m·kg, 17 ft·lb)
Pivot shaft nut
125 Nm (12.5 m·kg, 90 ft·lb)
Pivot shaft locknut
115 Nm (11.5 m·kg, 85 ft·lb)

b. Measure the swingarm side play “A” by moving the swingarm from side to side.

c. If the swingarm side play is out of specification, check the spacers, bearings, washers, and dust covers.

Swingarm side play (at the end of the swingarm)
0 mm (0 in)

d. Check the swingarm vertical movement “B” by moving the swingarm up and down.
If swingarm vertical movement is not smooth or if there is binding, check the spacers, bearings, washers, and dust covers.



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EAS23360

CHECKING THE SWINGARM

1. Check:
   - Swingarm
     Bends/cracks/damage → Replace.
2. Check:
   - Pivot shaft
     Roll the pivot shaft on a flat surface.
     Bends → Replace.

EWA13770

WARNING

Do not attempt to straighten a bent pivot shaft.

3. Wash:
   - Pivot shaft
   - Spacers
   - Washer
   - Bearings
   - Collar

Recommended cleaning solvent
Kerosene

4. Check:
   - Spacers
   - Washer
   - Collar
   - Oil seals
     Damage/wear → Replace.
   - Bearings
     Damage/pitting → Replace.

EAS23390

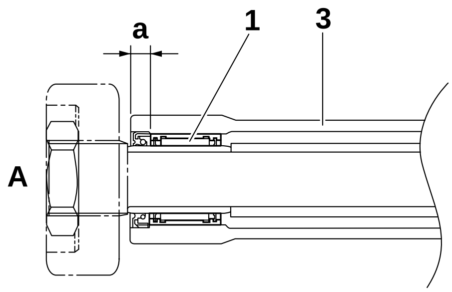
INSTALLING THE SWINGARM

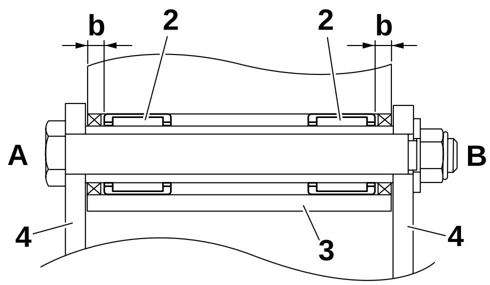
1. Lubricate:
   - Bearings
   - Oil seals
   - Pivot shaft

Recommended lubricant
Lithium-soap-based grease

2. Install:
   - Bearing “1”
   - Bearings “2”

Installed depth “a”
7.0 mm (0.28 in)
Installed depth “b”
4.0 mm (0.16 in)





3. Swingarm
4. Connecting arm
A. Left side
B. Right side

3. Tighten:
   • Pivot shaft

Pivot shaft
23 Nm (2.3 m·kg, 17 ft·lb)

   • Pivot shaft locknut

Pivot shaft locknut
115 Nm (11.5 m·kg, 85 ft·lb)

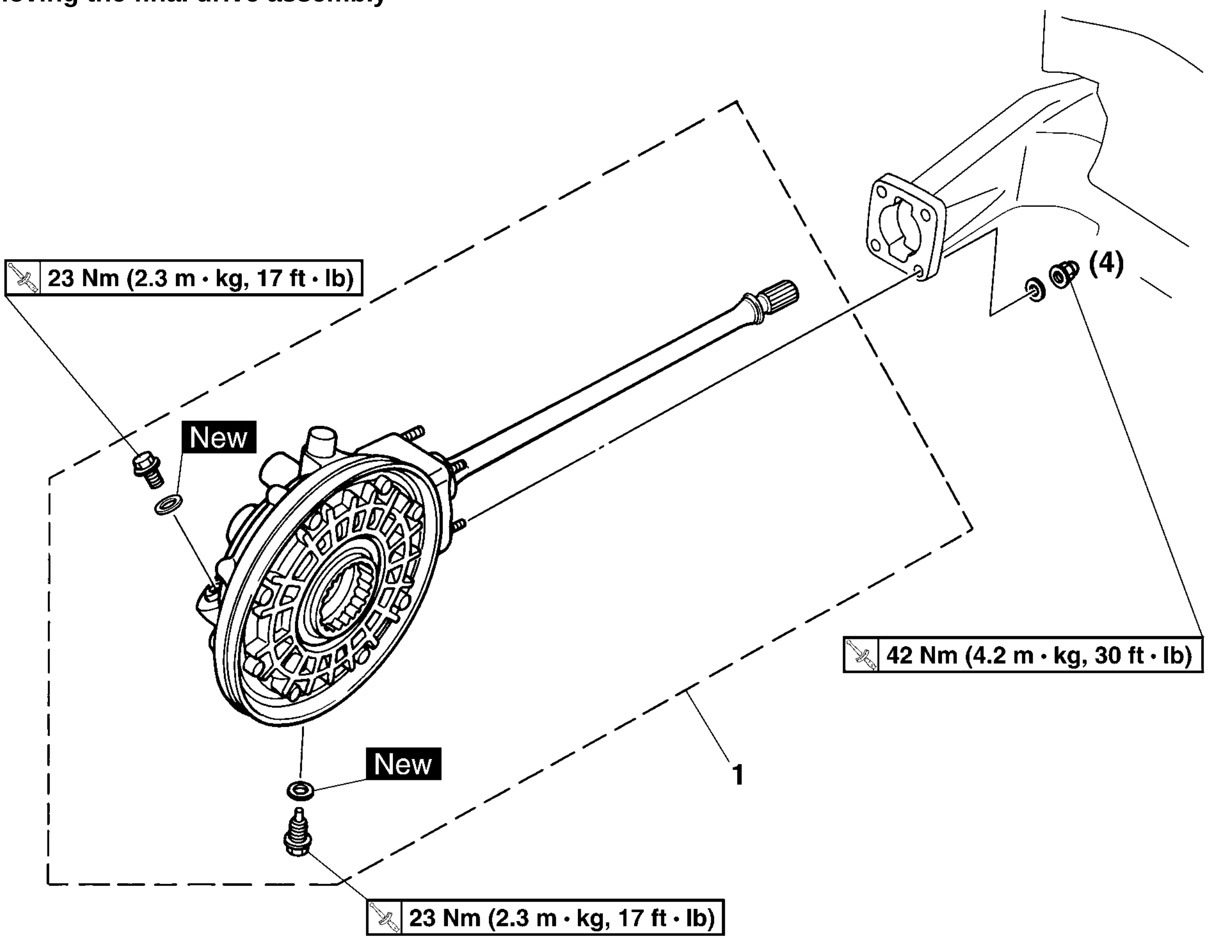
   • Pivot shaft nut

Pivot shaft nut
125 Nm (12.5 m·kg, 90 ft·lb)

EAS23550

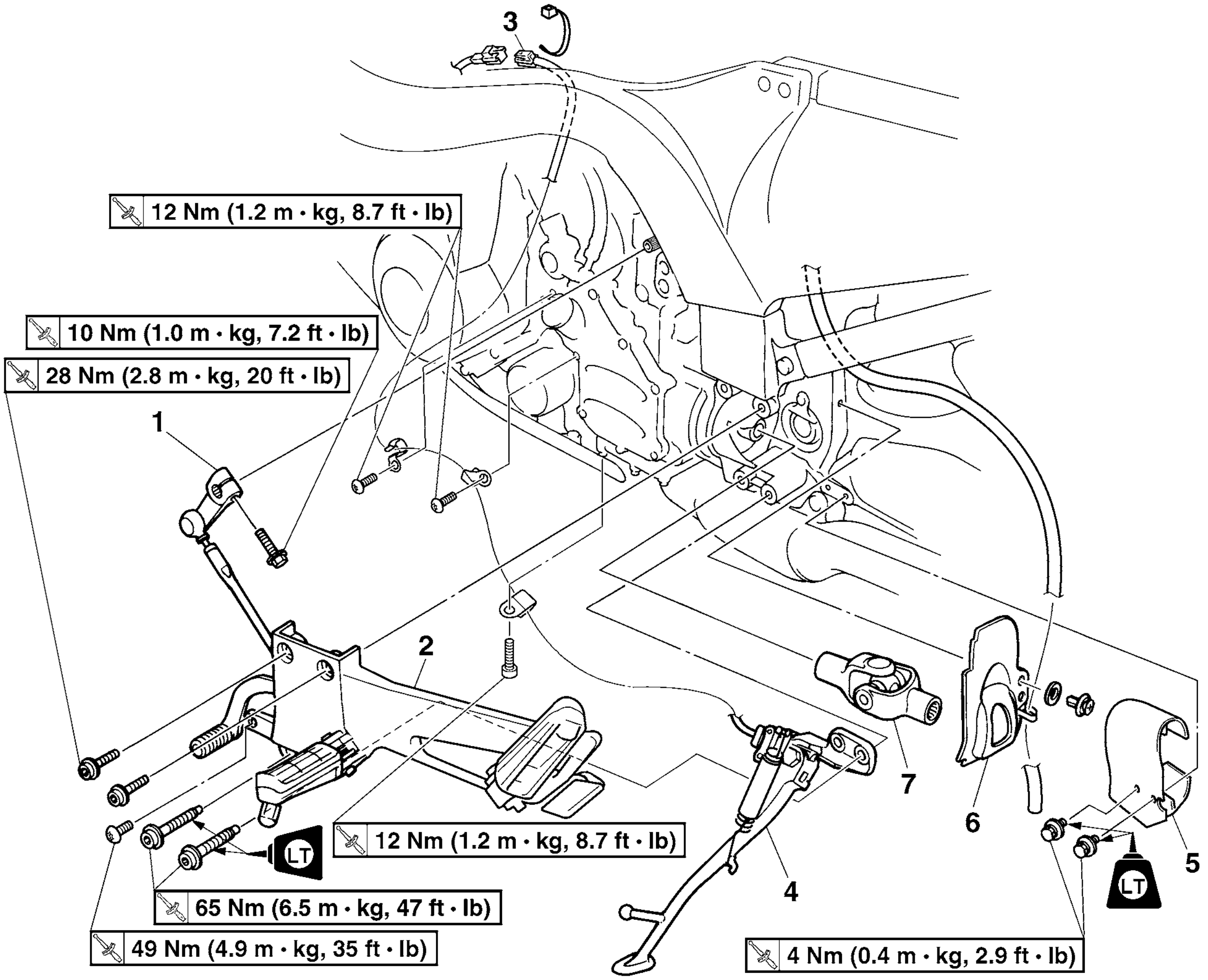
SHAFT DRIVE

Removing the final drive assembly



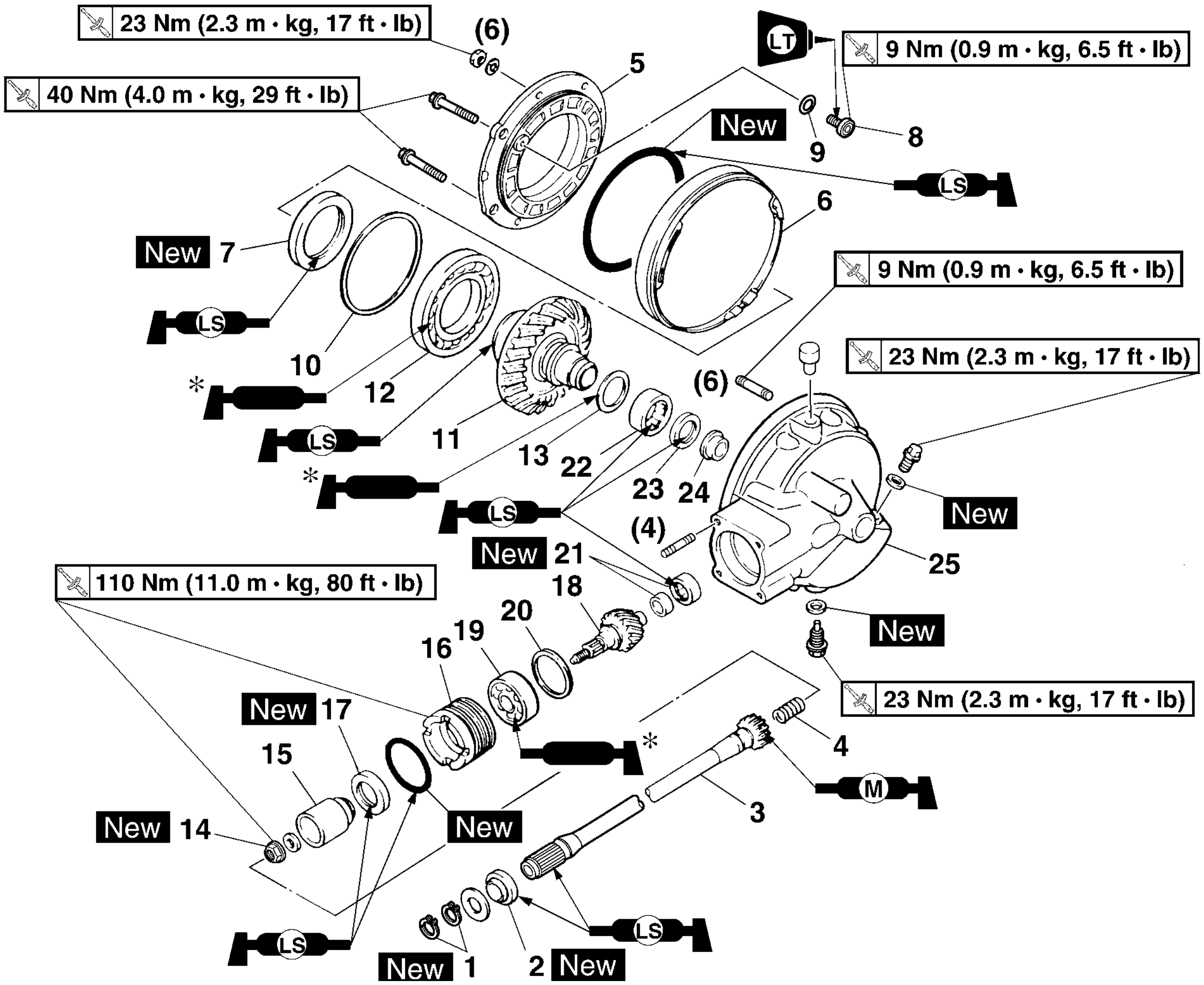
Order	Job/Parts to remove	Q'ty	Remarks
	Final gear oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-15.
	Rear wheel		Refer to "REAR WHEEL" on page 4-25.
1	Final drive assembly	1	
			For installation, reverse the removal procedure.

Removing the universal joint



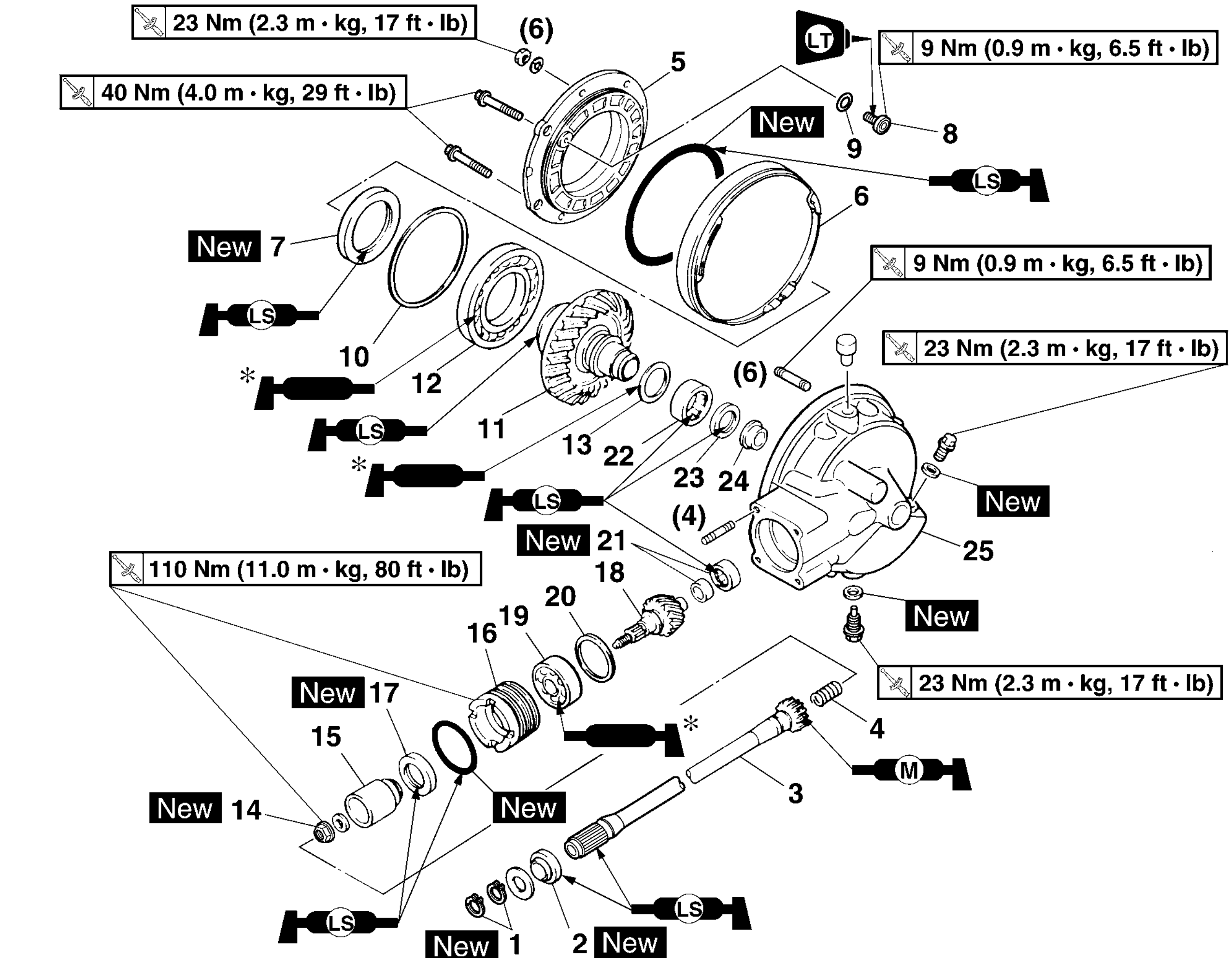
Order	Job/Parts to remove	Q'ty	Remarks
	Left footrest assembly/Sidestand		FJR13AE Refer to "SHIFT ACTUATOR AND SHIFT ROD (FJR13AE only)" on page 5-73.
1	Shift arm	1	FJR13A
2	Left footrest assembly	1	FJR13A
3	Sidestand switch coupler	1	FJR13A Disconnect.
4	Sidestand	1	FJR13A
5	Drive shaft dust cover	1	
6	Universal joint dust cover	1	
7	Universal joint	1	
			For installation, reverse the removal procedure.

Disassembling the final drive assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	Circlip	2	
2	Oil seal	1	
3	Drive shaft	1	
4	Spring	1	
5	Ring gear bearing housing	1	
6	Dust cover	1	
7	Oil seal	1	
8	Stopper bolt	1	Left-hand threads
9	Stopper bolt shim(s)		
10	Ring gear shim(s)		
11	Ring gear	1	
12	Bearing	1	
13	Thrust washer	1	
14	Coupling gear nut	1	
15	Coupling gear	1	
16	Bearing retainer	1	Left-hand threads
17	Oil seal	1	

Disassembling the final drive assembly



Order	Job/Parts to remove	Q'ty	Remarks
18	Final drive pinion gear	1	
19	Bearing	1	
20	Final drive pinion gear shim(s)		
21	Final drive pinion gear bearing	1	
22	Ring gear bearing	1	
23	Oil seal	1	
24	Collar	1	
25	Final gear case	1	
			For assembly, reverse the disassembly procedure.

* Apply shaft drive gear oil (Part No.: 9079E-SH001-00)

EAS23560
TROUBLESHOOTING

Symptom	Possible cause
1. A pronounced hesitation or jerky movement during acceleration, deceleration or sustained speeds (not to be confused with engine surging or transmission-related movements). 2. A rolling "rumble" noticeable at low speeds, a high-pitched whine or a "clunk" from a shaft drive component, or from the vicinity of the shaft drive. 3. The shaft drive is locked up or no power is transmitted from the engine to the rear wheel.	A. Bearing damage B. Improper gear backlash C. Damaged gear teeth D. Broken drive shaft E. Broken gear teeth F. Seizure due to lack of lubrication G. Small foreign objects lodged between moving parts

TIP

Causes A, B and C may be extremely difficult to diagnose. The symptoms are quite subtle and difficult to distinguish from normal operating noises. If there is reason to believe that these components are damaged, remove them and check them individual.

Inspection notes

1. Investigate any unusual noises.

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The following noises may indicate a mechanical defect:

a. A rolling "rumble" during coasting, acceleration or deceleration (increases with the rear wheel speed, but does not increase with higher engine or transmission speeds).
   Wheel bearing damage
b. A whining noise that varies with acceleration and deceleration
   Incorrect reassembly or too little gear backlash

EWA13780
⚠ WARNING

Insufficient gear backlash is extremely destructive to the gear teeth. If a test ride, following reassembly, indicates these symptoms, stop riding immediately to minimize gear damage.

c. A slight "clunk" evident at low speed operation (not to be confused with normal vehicle operation).
   Broken gear teeth

EWA13790
⚠ WARNING

Stop riding immediately if broken gear teeth are suspected. This condition could result in the shaft drive assembly locking up, causing a loss of control and possible injury to the rider.

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Troubleshooting chart

When causes (A) or (B) shown in the table at the beginning of the "TROUBLESHOOTING" section exist, check the following points.

1. Place the vehicle on a suitable stand so that the front wheel is elevated and then spin the front wheel. Are the wheel bearings damaged?	YES →	• Replace the wheel bearing(s). • Refer to "FRONT WHEEL" on page 4-17.

NO ↓

2. Place the vehicle on a suitable stand so that the rear wheel is elevated and then spin the rear wheel. Is the wheel bearing damaged?	NO →	Rear wheel bearings and shaft drive bearings are probably not damaged. Repeat the test or remove and check the components.
YES ↓		
3. Remove the rear wheel. Are the wheel bearings damaged?	YES →	• Replace the rear wheel bearing(s). • Refer to "REAR WHEEL" on page 4-25.
NO ↓		
Remove and check the drive shaft components.		

EAS23570

CHECKING THE FINAL DRIVE OIL FOR CONTAMINATION AND CHECKING THE SHAFT DRIVE FOR LEAKS

1. Drain:
   - Final gear oil
     (from the final gear case)
     Refer to "CHANGING THE FINAL GEAR OIL" on page 3-33.
2. Check:
   - Final gear oil
     Large amount of metal particles → Check for bearing seizure.

TIP

A small amount of metal particles in the final gear oil is normal.

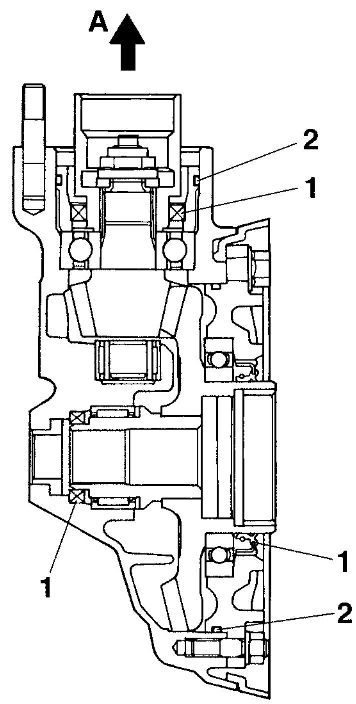
3. Check:
   - Shaft drive housing
     (for oil leaks)

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a. Thoroughly clean the entire vehicle and then completely dry it.
b. Apply a leak-locating compound or dry powder spray to the shaft drive.
c. Test ride the vehicle long enough to locate a leak.
   Oil leak → Repair or replace the faulty part(s).

TIP

- What may appear to be an oil leak on a new or fairly new vehicle, may result from the application of a rust preventive coating or excessive seal lubrication.
- Always clean the vehicle and recheck the area where the leak is thought to originate from.



1. Oil seal
2. O-ring
A. Forward

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EAS23580

MEASURING THE FINAL GEAR BACKLASH

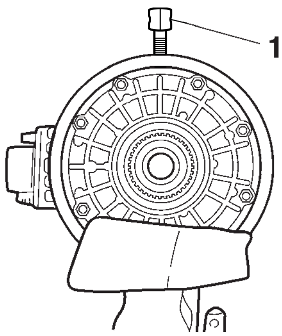
1. Secure the final drive assembly in a vise.
2. Remove:
   - Final gear oil drain bolt
3. Drain:
   - Final gear oil
     (from the final drive assembly)
4. Measure:
   - Final gear backlash
     Out of specification → Adjust.

Final gear backlash
0.22–0.45 mm (0.0087–0.0177 in)

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a. Install the ring gear fix bolt (M14) “1”, into the final gear oil drain hole.

Ring gear fix bolt (M14)
90890-01524
YM-01524



b. Finger tighten the ring gear fix bolt (M14) until it stops the ring gear from moving.

TIP

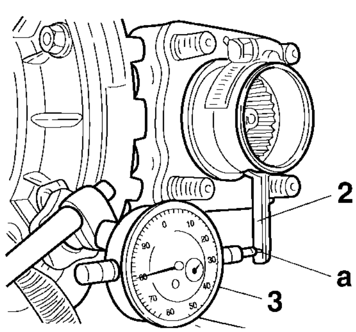
Do not overtighten the ring gear fix bolt (M14).

c. Install the final gear backlash band “2” and dial gauge “3”.

TIP

Make sure that the dial gauge plunger contacts the groove “a” in the final gear backlash band as shown in the illustration.

Final gear backlash band
90890-01511
Middle drive gear lash tool
YM-01230



d. Gently rotate the coupling gear from engagement to engagement.
e. Record the reading on the dial gauge.
f. Remove the dial gauge, final gear backlash band, and ring gear fix bolt (M14).
g. Rotate the final drive pinion gear 90°.
h. Reinstall the ring gear fix bolt (M14), final gear backlash band, and dial gauge.
i. Repeat steps (d) to (h) three more times (for a total of four measurements).
j. If any of the readings are over specification, adjust the final gear backlash.

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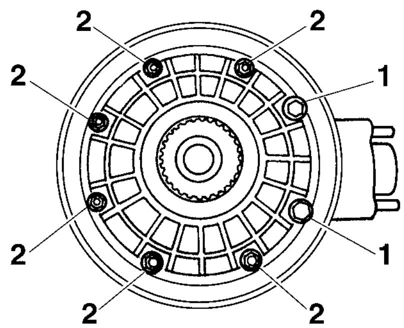
EAS23590

ADJUSTING THE FINAL GEAR BACKLASH

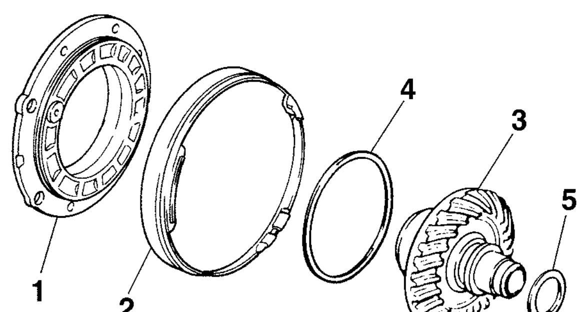
1. Remove:
   - Ring gear bearing housing bolts “1”
   - Ring gear bearing housing nuts “2”

TIP

Working in a crisscross pattern, loosen each bolt and nut 1/4 of a turn. After all of the bolts and nuts are fully loosened, remove them.



2. Remove:
   - Ring gear bearing housing “1”
   - Dust cover “2”
   - Ring gear “3”
   - Ring gear shim(s) “4”
   - Thrust washer “5”



3. Adjust:
   - Final gear backlash

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a. Select the suitable shim(s) and thrust washer with the following chart.

Thinner shim	Final gear backlash is increased.
Thicker shim	Final gear backlash is decreased.

b. If it is necessary to increase the final gear backlash by more than 0.2 mm, reduce the thrust washer thickness by 0.2 mm for every 0.2 mm increase of ring gear shim thickness.
c. If it is necessary to reduce the final gear backlash by more than 0.2 mm, increase the thrust washer thickness by 0.2 mm for every 0.2 mm decrease of ring gear shim thickness.

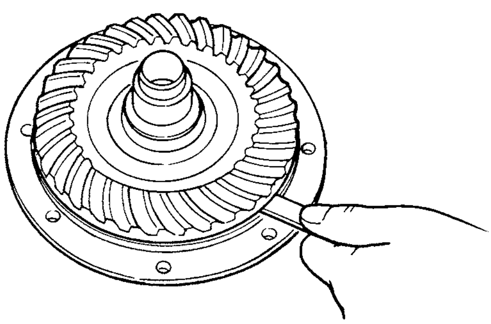
Ring gear shims
Thickness (mm)
0.25 0.30 0.40 0.50

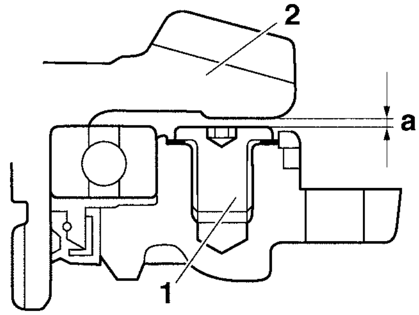
Thrust washers
Thickness (mm)
1.2 1.4 1.6 1.8 2.0

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EAS23600
MEASURING THE RING-GEAR-TO-STOPPER-BOLT CLEARANCE
1. Remove:
   - Ring gear bearing housing (along with the ring gear) Refer to "ADJUSTING THE FINAL GEAR BACKLASH" on page 4-107.
2. Measure:
   - Ring-gear-to-stopper-bolt clearance "a" Out of specification → Adjust.

Ring-gear-to-stopper-bolt clearance
0.30–0.60 mm (0.0118–0.0236 in)

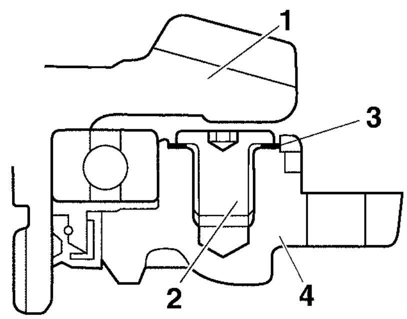




1. Stopper bolt
2. Ring gear

3. Install:
   - Ring gear bearing housing (along with the ring gear)

EAS23610
ADJUSTING THE RING-GEAR-TO-STOPPER-BOLT CLEARANCE
1. Remove:
   - Ring gear "1"
   - Stopper bolt "2"
   - Stopper bolt shim(s) "3"
   - Ring gear bearing housing "4"



2. Select:
   - Stopper bolt shim(s)

Stopper bolt shims
Thickness (mm)
0.15 0.20

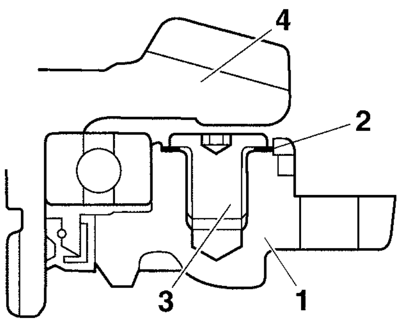
3. Install:
   - Ring gear bearing housing "1"
   - Stopper bolt shim(s) "2"
   - Stopper bolt "3"
   - Ring gear "4"

Stopper bolt
9 Nm (0.9 m·kg, 6.5 ft·lb)

ECA14320

NOTICE

- **The stopper bolt has left-hand threads. To tighten the stopper bolt, turn it counter-clockwise.**
- **Apply LOCTITE® onto the stopper bolt.**



4. Measure:
   - Ring-gear-to-stopper-bolt clearance

	Ring-gear-to-stopper-bolt clearance **0.30–0.60 mm (0.0118–0.0236 in)**

TIP

If the ring-gear-to-stopper-bolt clearance is out of specification, repeat the above procedure.

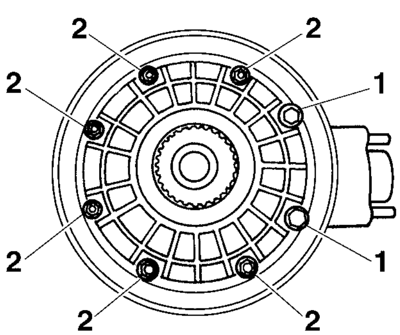
EAS23620

DISASSEMBLING THE FINAL DRIVE ASSEMBLY

1. Remove:
   - Ring gear bearing housing bolts “1”
   - Ring gear bearing housing nuts “2”

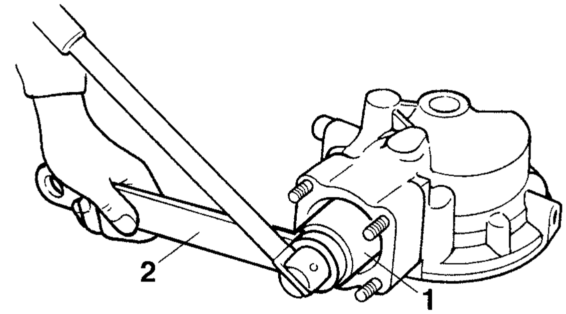
TIP

Working in a crisscross pattern, loosen each bolt and nut 1/4 of a turn. After all of the bolts and nuts are fully loosened, remove them.



2. Remove:
   - Coupling gear nut
   - Coupling gear “1”
     (with the coupling gear/middle shaft tool “2”)

	Coupling gear/middle shaft tool **90890-01229** **Gear holder** **YM-01229**



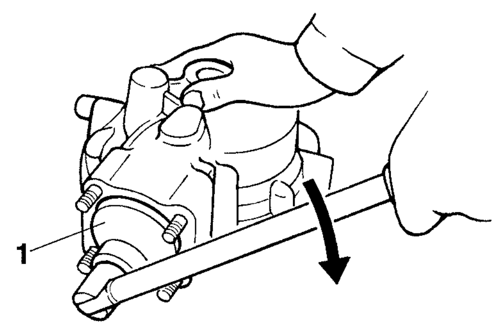
3. Remove:
   - Bearing retainer
     (with the bearing retainer wrench “1”)

	Bearing retainer wrench **90890-04050** **Pinion bearing retainer & remover** **YM-04050**

ECA14330

NOTICE

The bearing retainer has left-hand threads. To loosen the bearing retainer, turn it clockwise.



4. Remove:
   - Final drive pinion gear

EWA13800

WARNING

Always use new bearings.

ECA14340

NOTICE

The final drive pinion gear should only be removed if ring gear replacement is necessary.

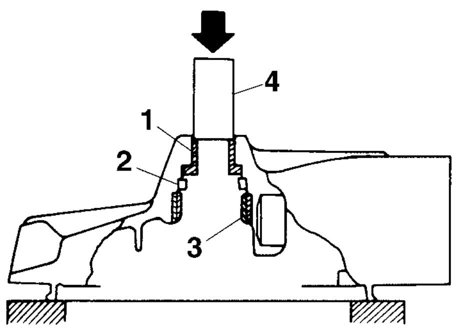
TIP

Lightly tap on the end of the final drive pinion gear with a soft hammer.

EAS23630

REMOVING AND INSTALLING THE BEARINGS

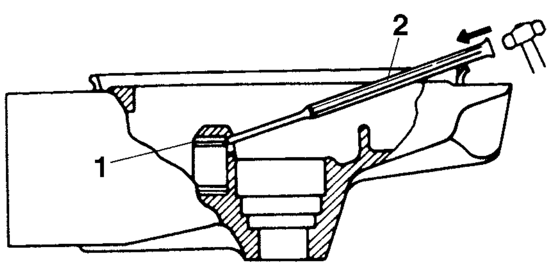
1. Check:
   - Bearings
     Damage → Replace.
2. Remove:
   - Collar "1"
   - Oil seal "2"
   - Bearing "3"
     (with an appropriate press tool "4" and an appropriate support for the final gear case)



3. Remove:
   - Bearing "1"

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a. Heat the final gear case to approximately 150 °C (302 °F).
b. Remove the bearing outer races with an appropriately shaped punch "2".



c. Remove the inner race from the final drive pinion gear.

TIP

The removal of the bearing is a difficult procedure and is rarely necessary.

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4. Install:
   - Bearing **New**

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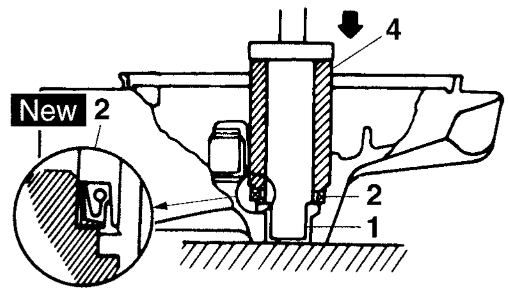
a. Heat the final gear case to approximately 150 °C (302 °F).
b. Install the bearing outer races with a socket or appropriate tool that matches the diameter of the races.
c. Install the inner race onto the final drive pinion gear.

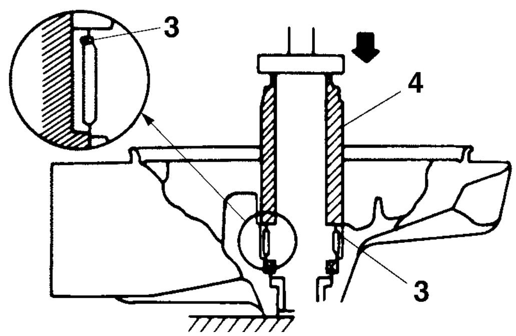
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5. Install:
   - Collar "1"
   - Oil seal "2" **New**
   - Bearing "3"
     (with an appropriate press tool "4" and press)

TIP

The bearing can be reused, but Yamaha recommends installing a new one.





EAS23640

ALIGNING THE FINAL DRIVE PINION GEAR AND RING GEAR

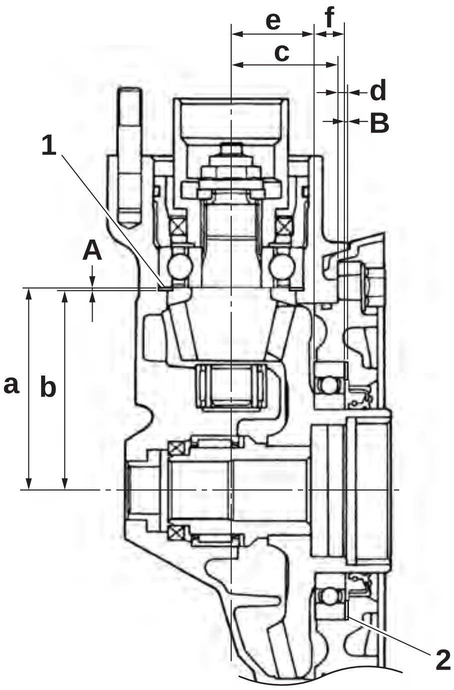
TIP

Aligning the final drive pinion gear and ring gear is necessary when any of the following parts are replaced:
- Final gear case
- Ring gear bearing housing
- Any bearing

1. Select:
   - Final drive pinion gear shim(s)
   - Ring gear shim(s)

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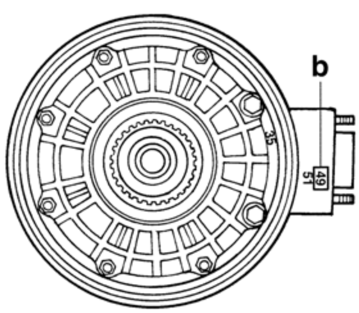
a. Position the final drive pinion gear shim(s) "1" and the ring gear with shim(s) "2". Calculate the respective thicknesses from information marked on the final gear case and the final drive pinion gear.



b. To find final drive pinion gear shim thickness "A", use the following formula:

Final drive pinion gear shim thickness A = (84 + a/100) - (83 + b/100)

Where:
a = 84
b = a numeral on the final gear case, to be divided by 100 and added to "83".



Example:
If the final drive pinion gear is marked "+01" and the final gear case is marked "50":

A	=	84 - (83 + 50/100)
	=	84 - (83 + 0.49)
	=	84 - 83.49
	=	0.51

Therefore, the calculated final drive pinion gear shim thickness is 0.51 mm. Shim sizes are supplied in the following thicknesses.

Final drive pinion gear shims **Thickness (mm)** **0.30 0.40 0.50**

Since the final drive pinion gear shims are only available in 0.10 mm increments, round off to the hundredths digit.

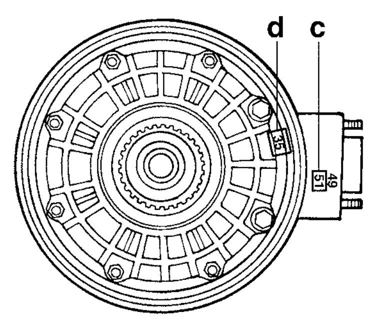
Hundredth	Rounded value
0, 1, 2	0
3, 4, 5, 6, 7	5
8, 9	10

In the example above, the calculated final drive pinion gear shim thickness is 0.51 mm. The chart instructs you to round off the 1 to 0. Thus, you should use a 0.50 mm final drive pinion gear shim.

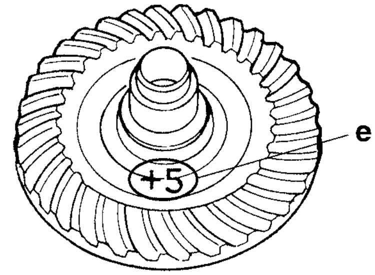
c. To find ring gear shim thickness "B", use the following formula:

Ring gear shim thickness B = (45 + c/100) + (3 + d/100) - [(35.40 - e/100) + f]

Where:
c = a numeral on the final gear case, to be divided by 100 and added to "45".
d = a numeral usually on the surface of the ring gear bearing housing, to be divided by 100 and added to "3".



e = a numeral (positive or negative) on the inside of the ring gear, to be divided by 100 and added to "35.40".



f = the ring gear bearing thickness constant.

Ring gear bearing thickness
13.00 mm (0.51 in)

Example:
If the final gear case is marked “51”, the ring gear bearing housing is marked “35”, the ring gear is marked “- 05”, and “f” is 13.00:

B = (45 + 51/100) + (3 + 35/100) - [(35.40 + 5/100) + 13]
= (45 + 0.51) + (3 + 0.35) - [(35.40 + 0.05) + 13]
= 45.51 + 3.35 - [(35.40 + 0.05) + 13]
= 48.86 - [35.45 + 13]
= 48.86 - 48.45
= 0.41

Therefore, the calculated ring gear shim thickness is 0.41 mm.
Shim sizes are supplied in the following thicknesses.

Ring gear shims
Thickness (mm)
0.25 0.30 0.40 0.50

Since the ring gear shims are only available in 0.10 mm increments, round off the hundredths digit.

Hundredth	Rounded value
0, 1, 2	0
3, 4, 5, 6, 7	5
8, 9	10

In the example above, the calculated ring gear shim thickness is 0.41 mm. The chart instructs you to round off the 1 to 0. Thus, you should use a 0.40 mm ring gear shim.

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2. Install:
   - Shims (as calculated)
   - Final drive pinion gear
   - Bearing retainer
   (with the bearing retainer wrench “1”)

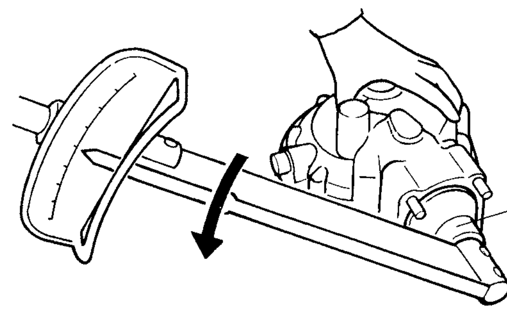
Bearing retainer
110 Nm (11.0 m·kg, 80 ft·lb)

ECA14350

NOTICE

The bearing retainer has left-hand threads. To tighten the bearing retainer, turn it counterclockwise.

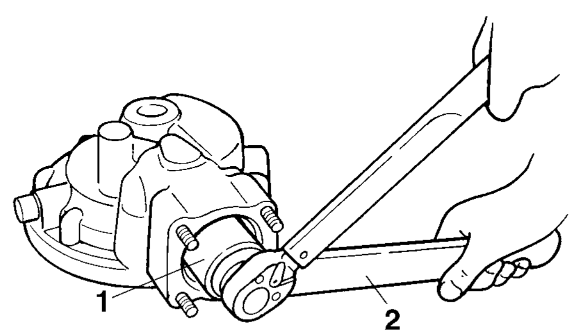
Bearing retainer wrench
90890-04050
Pinion bearing retainer & remover
YM-04050



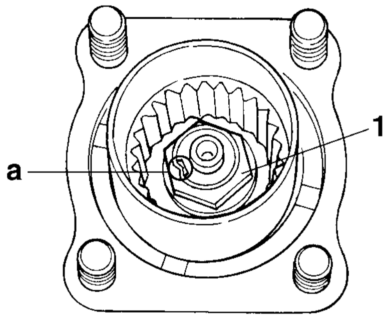
3. Install:
   - Coupling gear “1”
   - Coupling gear nut
   (with the coupling gear/middle shaft tool “2”)

Coupling gear nut
110 Nm (11.0 m·kg, 80 ft·lb)

Coupling gear/middle shaft tool
90890-01229
Gear holder
YM-01229



4. Stake the coupling gear nut “1” at a cutout “a” in the final drive pinion gear.



5. Install:
   - Ring gear bearing housing
     (along with the ring gear, but without the thrust washer)
6. Adjust:
   - Final gear backlash
     Refer to “MEASURING THE FINAL GEAR BACKLASH” on page 4-106 and “ADJUSTING THE FINAL GEAR BACKLASH” on page 4-107.
7. Measure:
   - Ring-gear-to-thrust-washer clearance

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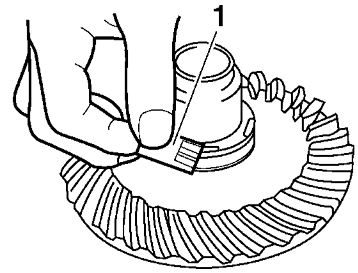
a. Remove the ring gear bearing housing (along with the ring gear).
b. Place four pieces of Plastigauge® between the original thrust washer and the ring gear.
c. Install the ring gear bearing housing and tighten the bolts and nuts to specification.

Ring gear bearing housing bolt
40 Nm (4.0 m·kg, 29 ft·lb)
Ring gear bearing housing nut
23 Nm (2.3 m·kg, 17 ft·lb)

TIP

Do not turn the final drive pinion gear and ring gear while measuring the ring-gear-to-thrust-washer clearance with Plastigauge®.

d. Remove the ring gear bearing housing.
e. Measure the width of the flattened Plastigauge® “1”.



Ring-gear-to-thrust-washer clearance
0.10–0.20 mm (0.0039–0.0079 in)

f. If the ring-gear-to-thrust-washer clearance is within specification, install the ring gear bearing housing (along with the ring gear).
g. If the ring-gear-to-thrust-washer clearance is out of specification, select the correct thrust washer as follows.
h. Select the suitable thrust washer from the following chart.

Thrust washers
Thickness (mm)
1.2 1.4 1.6 1.8 2.0

i. Repeat the measurement steps until the ring-gear-to-thrust-washer clearance is within the specified limits.

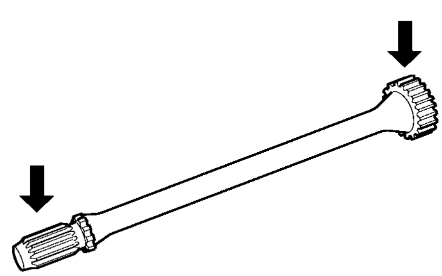
Ring-gear-to-thrust-washer clearance
0.10–0.20 mm (0.0039–0.0079 in)

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EAS23650

CHECKING THE DRIVE SHAFT

1. Check:
   - Drive shaft splines
     Damage/wear → Replace the drive shaft.



EAS23660

INSTALLING THE DRIVE SHAFT AND FINAL DRIVE ASSEMBLY (FJR13A)

1. Lubricate:
   - Drive shaft spline (final drive pinion gear side)

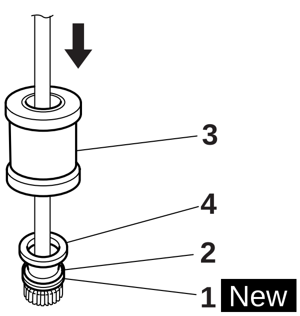
	Recommended lubricant **Molybdenum disulfide grease**

2. Lubricate:
   - Drive shaft spline (universal joint side)

	Recommended lubricant **Lithium-soap-based grease**

3. Install:
   - Oil seal "1" New
   - Washer "2"
     (with the fork seal driver weight "3" and fork seal driver attachment "4")

	Fork seal driver weight **90890-01184** **Replacement hammer** **YM-A9409-7** **Fork seal driver attachment** **90890-01186** **Replacement 27 mm** **YM-A9409-1**



4. Install:
   - Circlip New
5. Install:

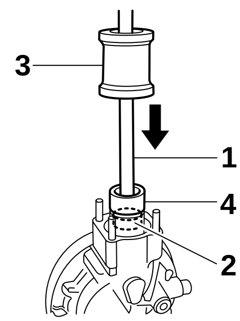
TIP

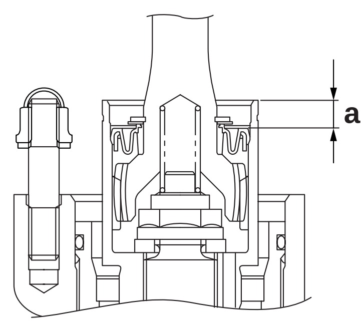
Perform step 5 for vehicles with the following frame numbers only.
- RP15N-000202 –

   - Drive shaft "1"
     (to the final drive pinion gear)
   - Oil seal "2"
     (to the final gear case with the fork seal driver weight "3" and oil seal installing tool "4")

	Fork seal driver weight **90890-01184** **Replacement hammer** **YM-A9409-7** **Oil seal installing tool** **90890-01512** **YM-01512**

	Installed depth "a" **8.5–10.0 mm (0.33–0.39 in)**





6. Install:
   - Universal joint
   - Final drive assembly

TIP

Align the drive shaft splines with the driven yoke of the universal joint.

---

7. Tighten:
   - Final drive assembly nuts

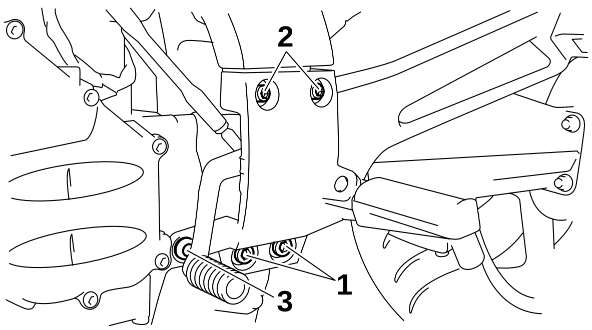
	Final gear case nut **42 Nm (4.2 m·kg, 30 ft·lb)**

8. Install:
   - Sidestand
   - Left footrest assembly

	Left footrest assembly/sidestand bolt **65 Nm (6.5 m·kg, 47 ft·lb)** **Left footrest assembly bolt (M8)** **28 Nm (2.8 m·kg, 20 ft·lb)** **Left footrest assembly bolt (M10)** **49 Nm (4.9 m·kg, 35 ft·lb)**

TIP

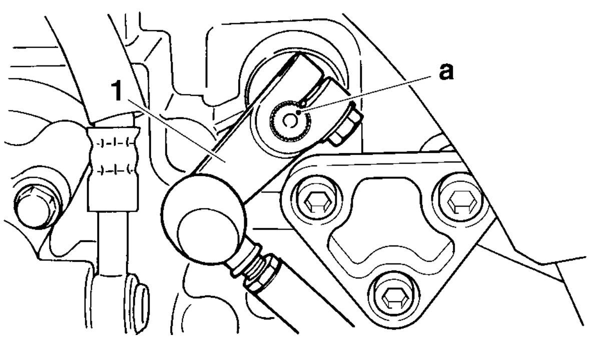
Install the left footrest assembly/sidestand bolts "1", left footrest assembly bolts (M8) "2" and left footrest assembly bolt (M10) "3" temporarily and then tighten them to the specified torques in the proper tightening sequence as shown.



9. Install:
   - Shift arm "1"

TIP

Align the punch mark "a" in the shift shaft with the slot in the shift arm.



10. Install:
    - Rear wheel
      Refer to "REAR WHEEL" on page 4-25.
11. Fill:
    - Final gear case
      Refer to "CHECKING THE FINAL GEAR OIL LEVEL" on page 3-33.
12. Check:
    - Shift pedal position
      Refer to "ADJUSTING THE SHIFT PEDAL (FJR13A)" on page 3-32.

ET3P66032

INSTALLING THE DRIVE SHAFT AND FINAL DRIVE ASSEMBLY (FJR13AE)

1. Lubricate:
   - Drive shaft spline (final drive pinion gear side)

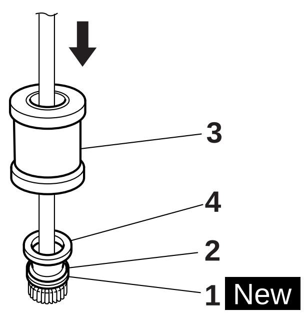
	Recommended lubricant **Molybdenum disulfide grease**

2. Lubricate:
   - Drive shaft spline (universal joint side)

	Recommended lubricant **Lithium-soap-based grease**

3. Install:
   - Oil seal "1" New
   - Washer "2"
     (with the fork seal driver weight "3" and fork seal driver attachment "4")

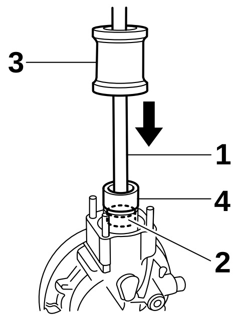
	Fork seal driver weight **90890-01184** **Replacement hammer** **YM-A9409-7** **Fork seal driver attachment** **90890-01186** **Replacement 27 mm** **YM-A9409-1**

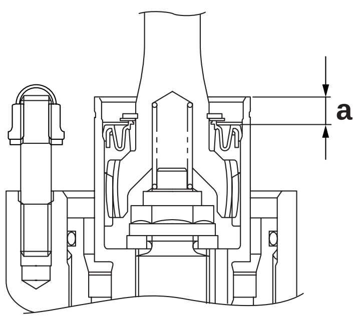


4. Install:
   - Circlip New
5. Install:
   - Drive shaft "1"
     (to the final drive pinion gear)
   - Oil seal "2"
     (to the final gear case with the fork seal driver weight "3" and oil seal installing tool "4")

Fork seal driver weight
90890-01184
Replacement hammer
YM-A9409-7
Oil seal installing tool
90890-01512
YM-01512

Installed depth “a”
8.5–10.0 mm (0.33–0.39 in)





6. Install:
   - Universal joint
   - Final drive assembly

TIP

Align the drive shaft splines with the driven yoke of the universal joint.

---

7. Tighten:
   - Final drive assembly nuts

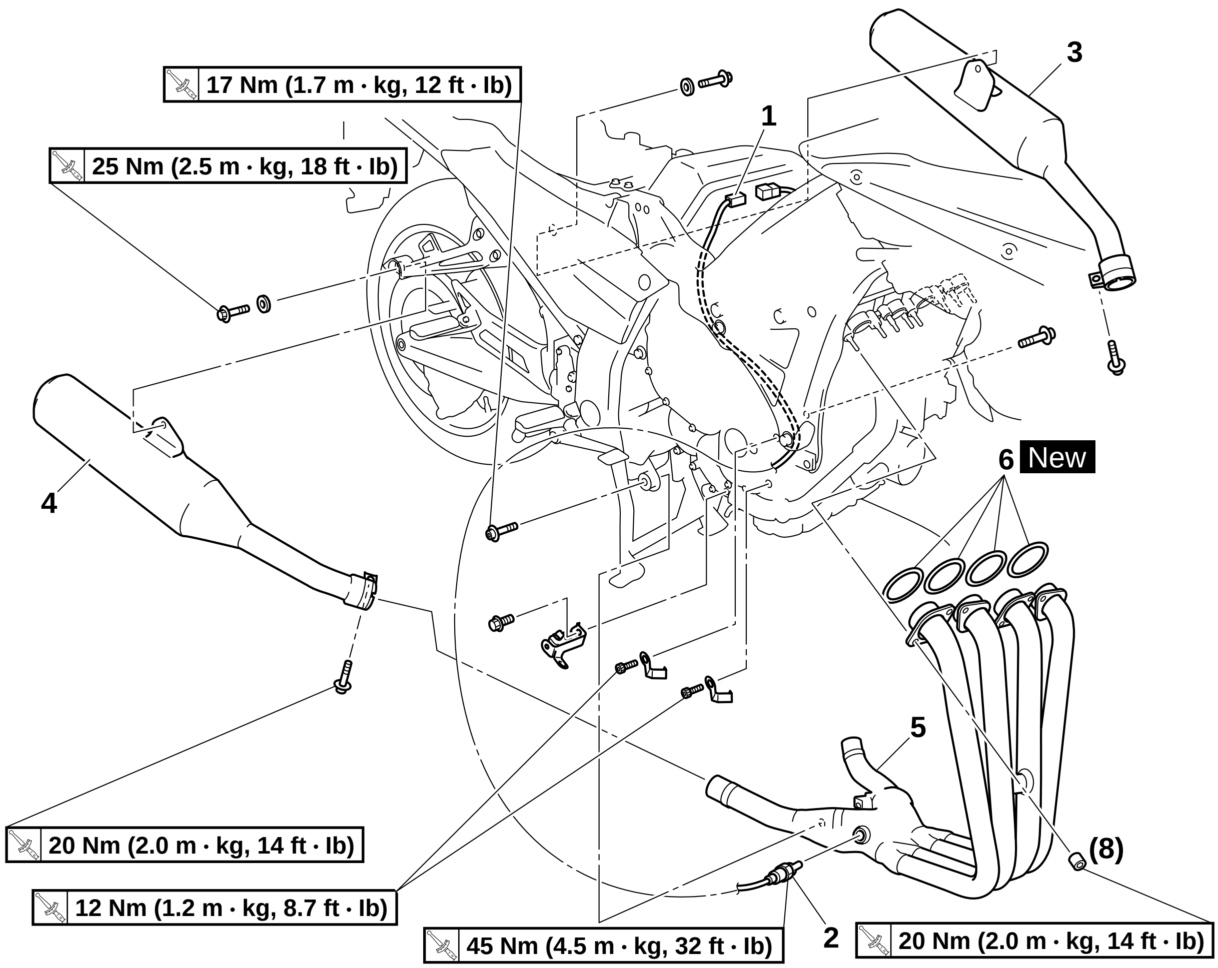
Final gear case nut
42 Nm (4.2 m·kg, 30 ft·lb)

8. Install:
   - Sidestand
   - Left footrest assembly
     Refer to “SHIFT ACTUATOR AND SHIFT ROD (FJR13AE only)” on page 5-73.
9. Install:
   - Rear wheel
     Refer to “REAR WHEEL” on page 4-25.
10. Fill:
    - Final gear case
      Refer to “CHECKING THE FINAL GEAR OIL LEVEL” on page 3-33.

ENGINE

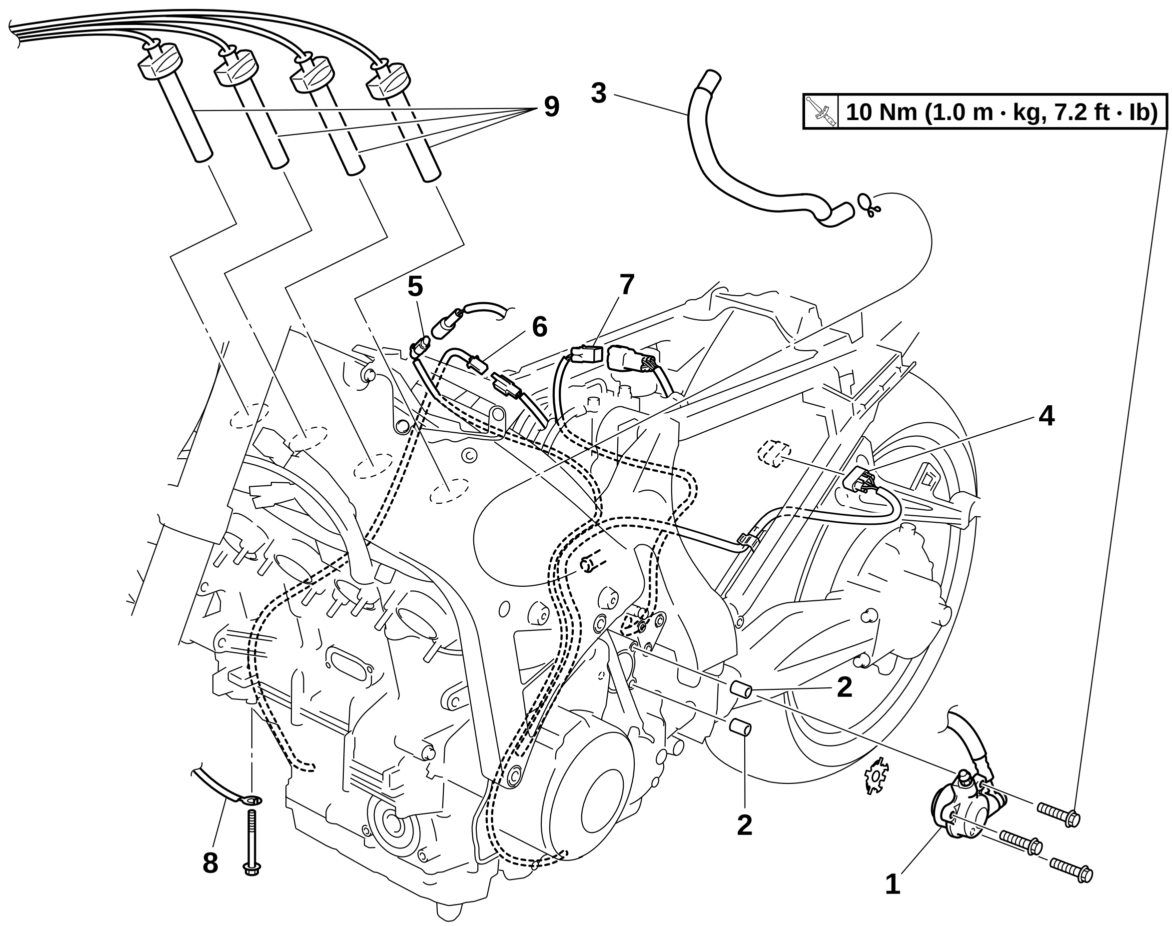
EAS23710
ENGINE REMOVAL

Removing the exhaust pipe assembly



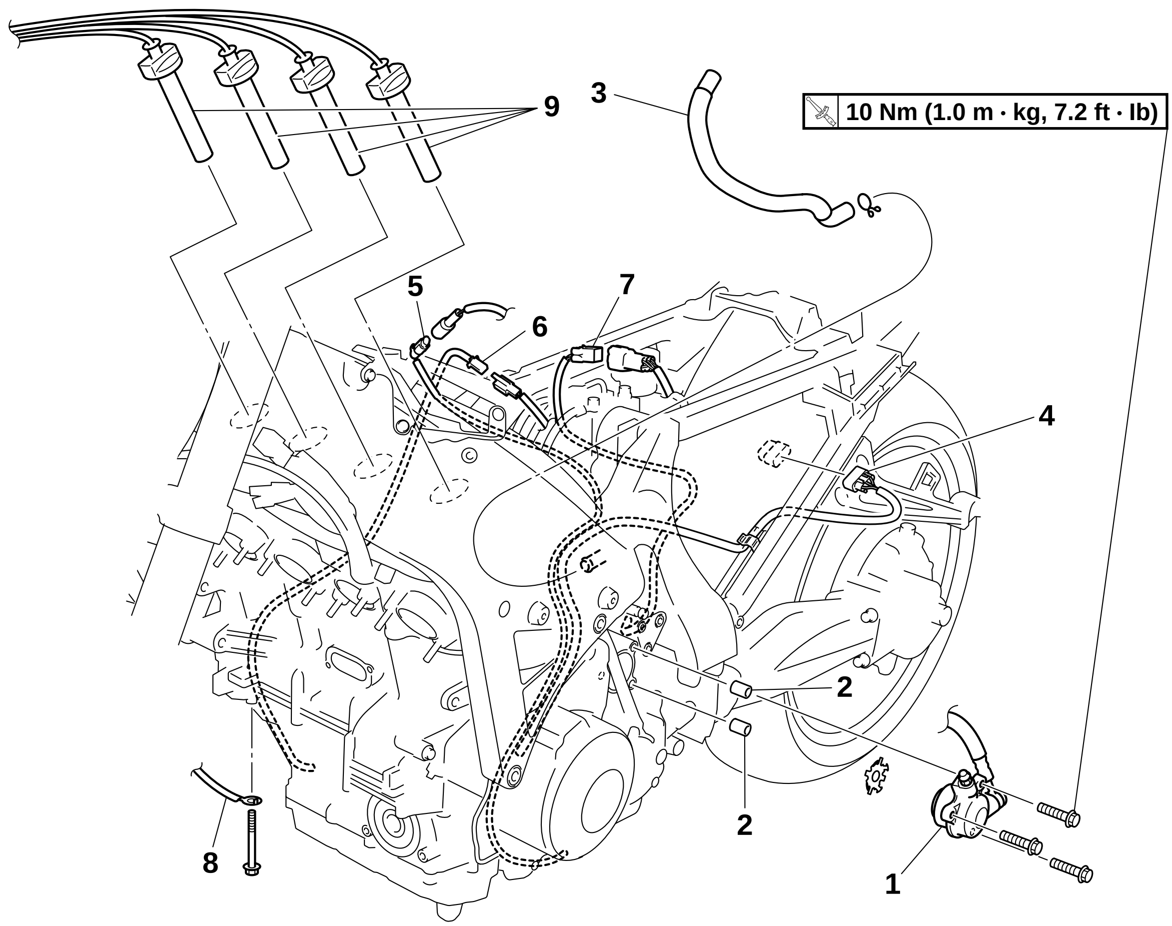
Order	Job/Parts to remove	Q'ty	Remarks
	Left side cowling/Right side cowling/T-bar		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-25.
	Radiator		Refer to "RADIATOR" on page 6-1.
1	O_2 sensor coupler	1	Disconnect.
2	O_2 sensor	1	
3	Left muffler	1	
4	Right muffler	1	
5	Exhaust pipe assembly	1	
6	Gasket	4	
			For installation, reverse the removal procedure.

Disconnecting the leads and hoses (FJR13A)



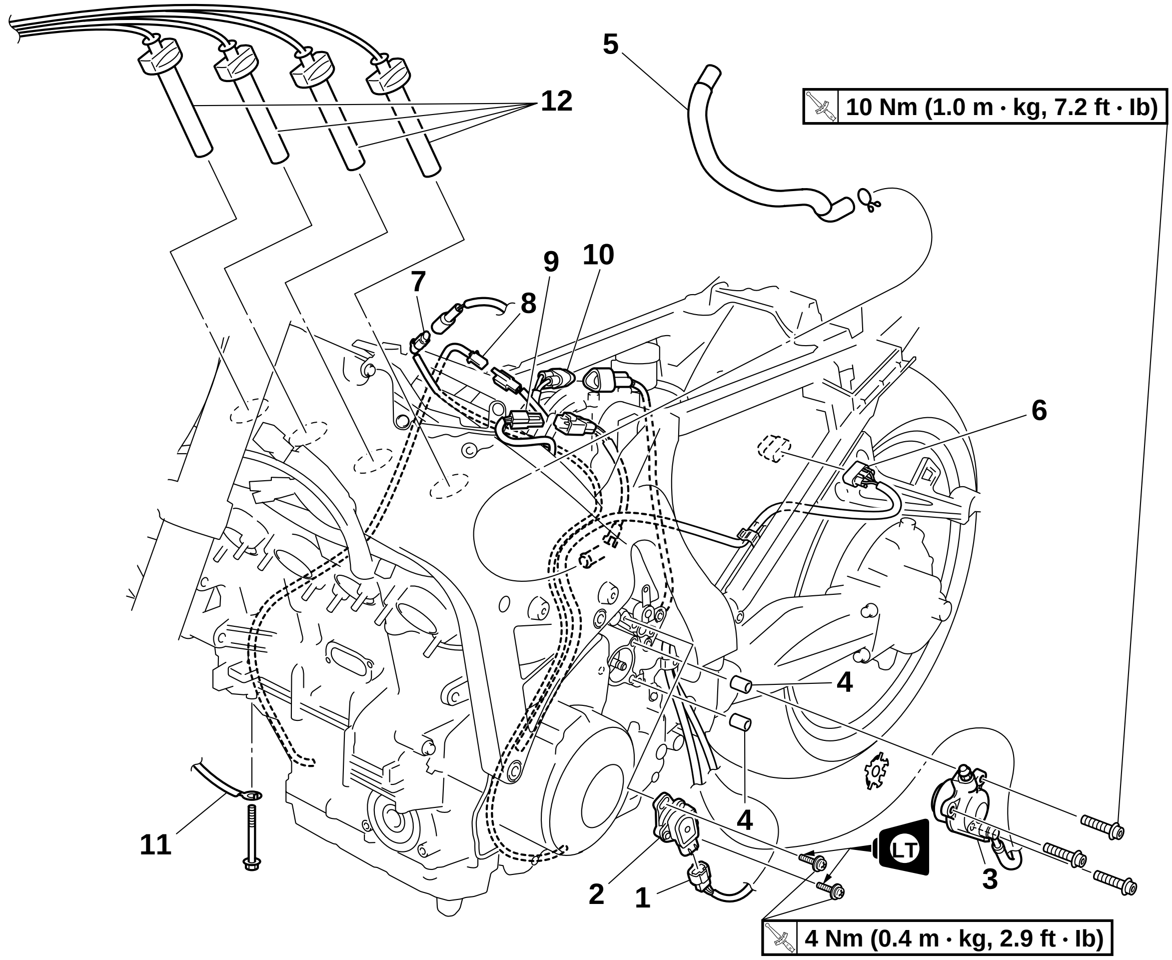
Order	Job/Parts to remove	Q'ty	Remarks
	Front fender		Refer to "FRONT WHEEL" on page 4-17.
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-5.
	Air cut-off valve/Reed valves		Refer to "AIR INDUCTION SYSTEM" on page 7-11.
	Thermostat/Thermostat inlet pipe 1		Refer to "THERMOSTAT" on page 6-6.
	Engine oil/Oil filter cartridge		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-15.
	Oil cooler		Refer to "OIL COOLER" on page 6-4.
	Water pump		Refer to "WATER PUMP" on page 6-10.
	Starter motor		Refer to "ELECTRIC STARTER" on page 5-42.
	Left footrest assembly/Sidestand		Refer to "SHAFT DRIVE" on page 4-101.
1	Clutch release cylinder	1	
2	Dowel pin	2	
3	Crankcase breather hose	1	
4	Stator coil coupler	1	Disconnect.

Disconnecting the leads and hoses (FJR13A)



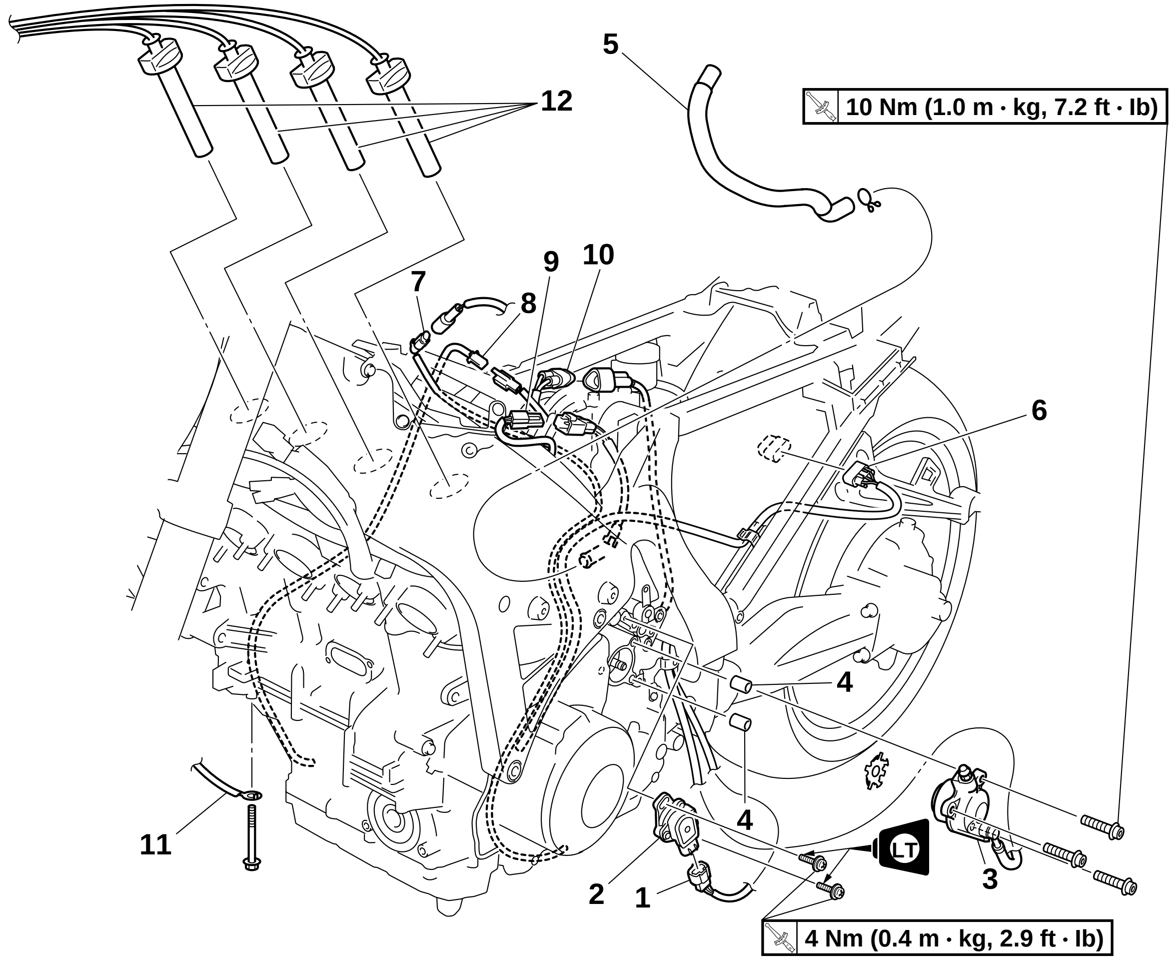
Order	Job/Parts to remove	Q'ty	Remarks
5	Oil level switch coupler	1	Disconnect.
6	Crankshaft position sensor coupler	1	Disconnect.
7	Gear position switch coupler	1	Disconnect.
8	Ground lead	1	Disconnect.
9	Spark plug cap	4	
			For installation, reverse the removal procedure.

Disconnecting the leads and hoses (FJR13AE)



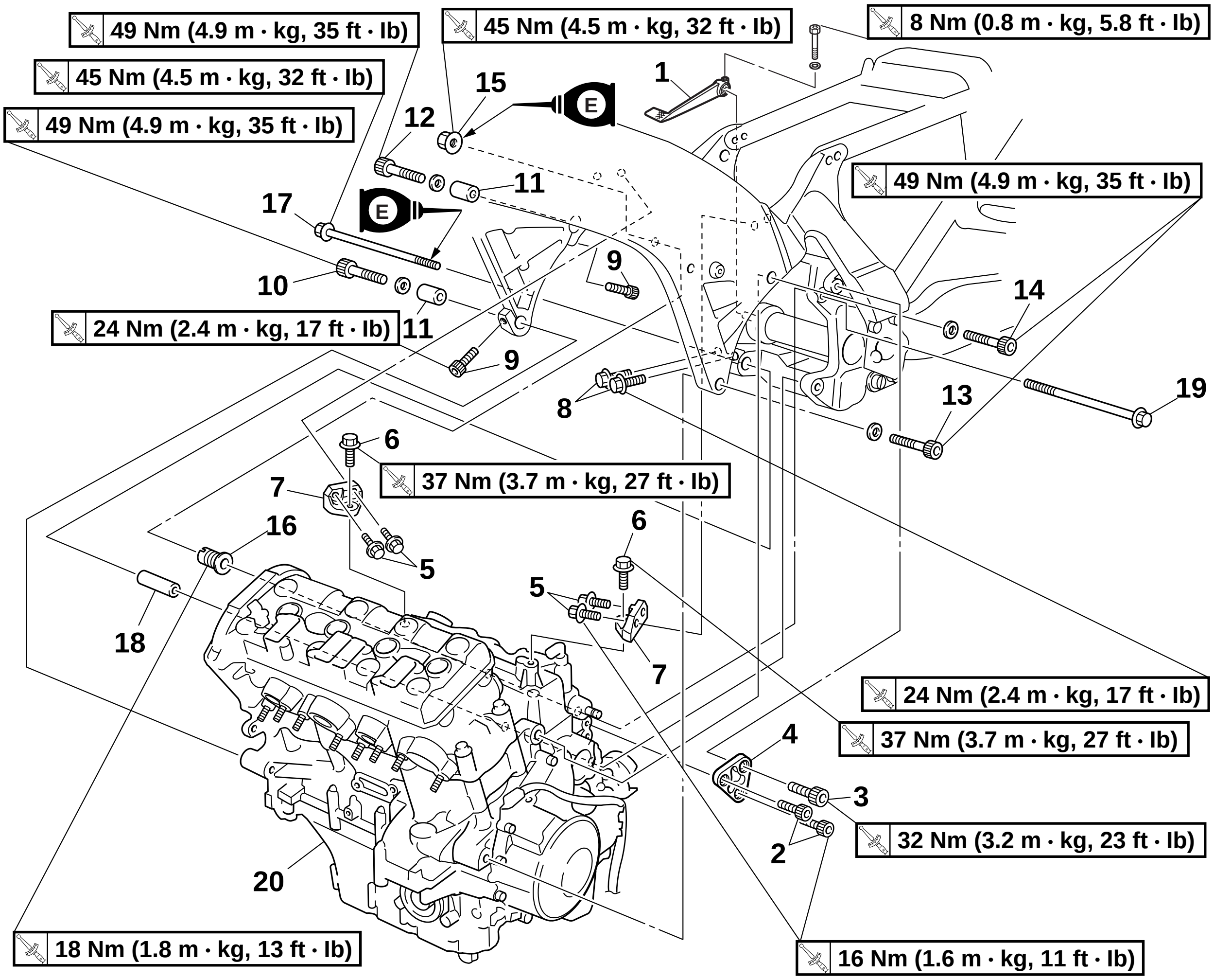
Order	Job/Parts to remove	Q'ty	Remarks
	Front fender		Refer to "FRONT WHEEL" on page 4-17.
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-5.
	Air cut-off valve/Reed valves		Refer to "AIR INDUCTION SYSTEM" on page 7-11.
	Thermostat/Thermostat inlet pipe 1		Refer to "THERMOSTAT" on page 6-6.
	Engine oil/Oil filter cartridge		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-15.
	Oil cooler		Refer to "OIL COOLER" on page 6-4.
	Water pump		Refer to "WATER PUMP" on page 6-10.
	Starter motor		Refer to "ELECTRIC STARTER" on page 5-42.
	Left footrest assembly/Sidestand		Refer to "SHIFT ACTUATOR AND SHIFT ROD (FJR13AE only)" on page 5-73.
	Gear position sensor cover		Refer to "SHIFT ACTUATOR AND SHIFT ROD (FJR13AE only)" on page 5-73.
1	Gear position sensor coupler	1	Disconnect.
2	Gear position sensor	1	

Disconnecting the leads and hoses (FJR13AE)



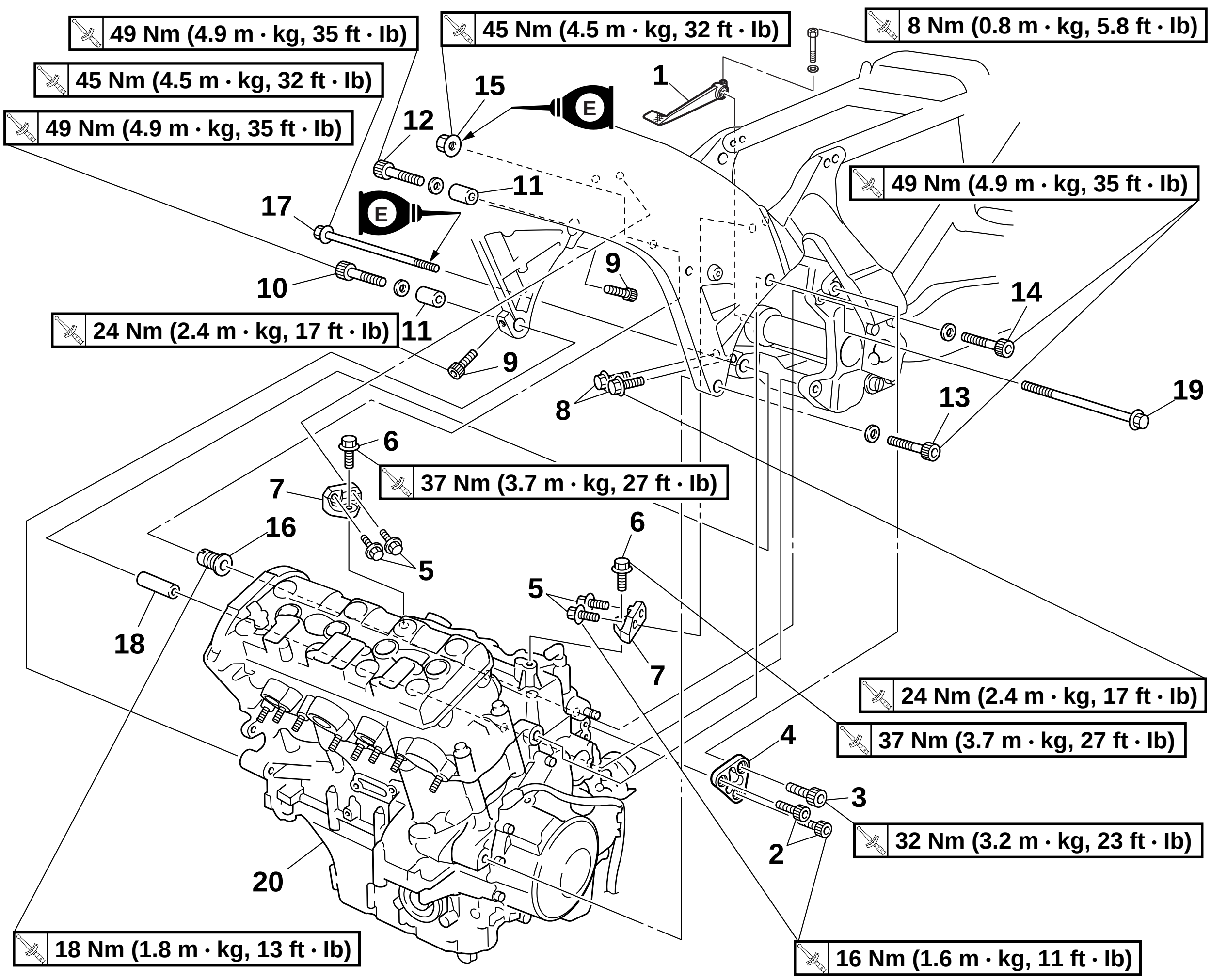
Order	Job/Parts to remove	Q'ty	Remarks
3	Clutch release cylinder	1	
4	Dowel pin	2	
5	Crankcase breather hose	1	
6	Stator coil coupler	1	Disconnect.
7	Oil level switch coupler	1	Disconnect.
8	Crankshaft position sensor coupler	1	Disconnect.
9	Neutral switch coupler	1	Disconnect.
10	YCC-S speed sensor coupler	1	Disconnect.
11	Ground lead	1	Disconnect.
12	Spark plug cap	4	
			For installation, reverse the removal procedure.

Removing the engine



Order	Job/Parts to remove	Q'ty	Remarks
			TIP Place a suitable stand under the engine.
1	Brake pedal	1	
2	Engine mounting bolt (left rear side)	2	
3	Engine bracket bolt (left rear side)	1	
4	Engine bracket (left rear side)	1	
5	Engine bracket bolt (top)	4	
6	Engine mounting bolt (top)	2	
7	Engine bracket (top)	2	
8	Pinch bolt (rear side)	2	
9	Pinch bolt (front side)	2	
10	Engine mounting bolt (right front lower side)	1	
11	Spacer	2	
12	Engine mounting bolt (right front upper side)	1	
13	Engine mounting bolt (left front lower side)	1	
14	Engine mounting bolt (left front upper side)	1	
15	Engine mounting nut (rear upper side)	1	

Removing the engine



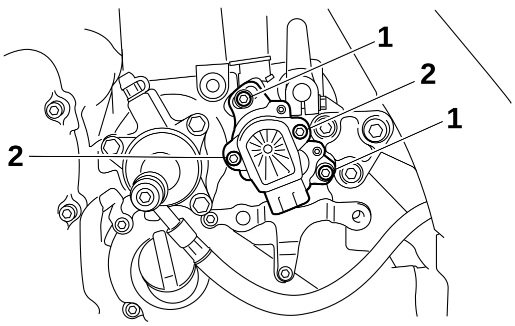
Order	Job/Parts to remove	Q'ty	Remarks
16	Spacer bolt	1	Loosen.
17	Engine mounting bolt (rear lower side)	1	
18	Spacer	1	
19	Engine mounting bolt (rear upper side)	1	
20	Engine	1	
			For installation, reverse the removal procedure.

ET3P66033
REMOVING THE GEAR POSITION SENSOR (FJR13AE only)

1. Disconnect:
   - Gear position sensor coupler
2. Remove:
   - Gear position sensor

TIP

Remove only the screws “1” when removing the gear position sensor. Do not remove the screws “2”.



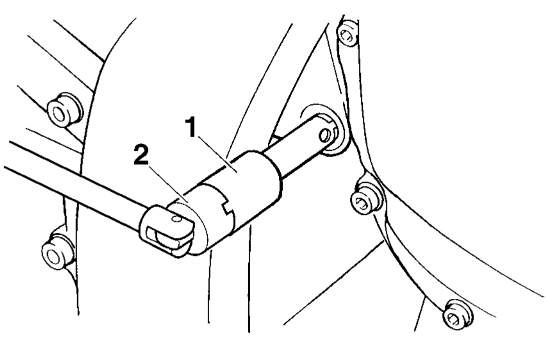
ET3P61023
REMOVING THE ENGINE (FJR13A)

1. Loosen:
   - Spacer bolt

TIP

Loosen the spacer bolt with the pivot shaft wrench “1” and pivot shaft wrench adapter “2”.

Pivot shaft wrench
90890-01471
Frame spanner socket
YM-01471
Pivot shaft wrench adapter
90890-01476



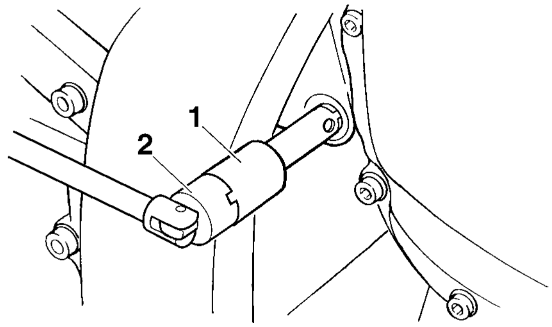
ET3P66034
REMOVING THE ENGINE (FJR13AE)

1. Loosen:
   - Spacer bolt

TIP

Loosen the spacer bolt with the pivot shaft wrench “1” and pivot shaft wrench adapter “2”.

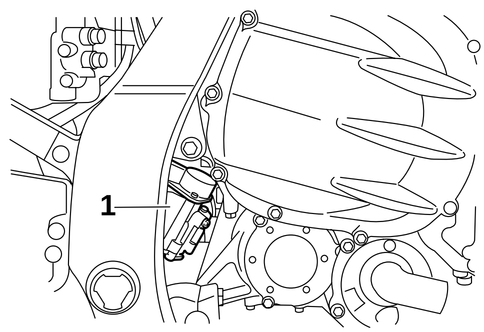
Pivot shaft wrench
90890-01471
Frame spanner socket
YM-01471
Pivot shaft wrench adapter
90890-01476



2. Remove:
   - Engine

TIP

Make sure that the engine does not strike the clutch actuator “1” when removing it.



EAS23720
INSTALLING THE ENGINE

1. Install:
   - Engine

TIP

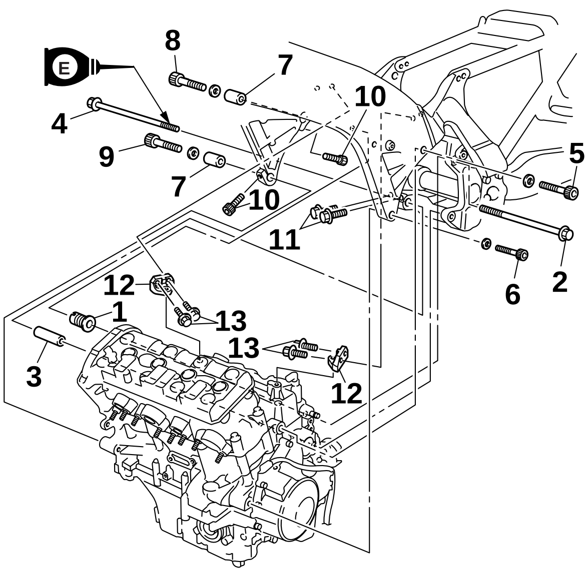
When mounting the engine to the frame, be sure to align the splines on the middle driven shaft with the splines on the universal joint.

2. Install:
   - Spacer bolt “1”
   - Engine mounting bolt (rear upper side) “2”
   - Spacer “3”
   - Engine mounting bolt (rear lower side) “4”
   - Engine mounting bolt (left front upper side) “5”

- Engine mounting bolt (left front lower side) "6"
- Spacers "7"
- Engine mounting bolt (right front upper side) "8"
- Engine mounting bolt (right front lower side) "9"
- Pinch bolts (front side) "10"
- Pinch bolts (rear side) "11"
- Engine brackets (top) "12"
- Engine bracket bolts (top) "13"

TIP

- Lubricate the engine mounting bolt (rear lower side) threads with engine oil.
- Do not fully tighten the bolts.



3. Tighten:
   - Engine mounting bolt (left front upper side) "5"

Engine mounting bolt (left front upper side)
49 Nm (4.9 m·kg, 35 ft·lb)

4. Tighten:
   - Engine mounting bolt (rear lower side) "4"

Engine mounting bolt (rear lower side)
45 Nm (4.5 m·kg, 32 ft·lb)

5. Tighten:
   - Spacer bolt "1"

Spacer bolt
18 Nm (1.8 m·kg, 13 ft·lb)

TIP

- Tighten the spacer bolt "1" to specification with a pivot shaft wrench.
- When tightened, the spacer bolt should be flat against the engine surface.

Pivot shaft wrench
90890-01471
Frame spanner socket
YM-01471
Pivot shaft wrench adapter
90890-01476

6. Tighten:
   - Engine mounting nut (rear upper side) "14"

Engine mounting nut (rear upper side)
45 Nm (4.5 m·kg, 32 ft·lb)

TIP

Lubricate the engine mounting nut (rear upper side) threads with engine oil.

7. Tighten:
   - Engine mounting bolt (left front lower side) "6"
   - Engine mounting bolt (right front upper side) "8"
   - Engine mounting bolt (right front lower side) "9"

Engine mounting bolt (left front lower side)
49 Nm (4.9 m·kg, 35 ft·lb)
Engine mounting bolt (right front upper side)
49 Nm (4.9 m·kg, 35 ft·lb)
Engine mounting bolt (right front lower side)
49 Nm (4.9 m·kg, 35 ft·lb)

8. Install:
   - Engine mounting bolts (top) "15"
9. Tighten:
   - Pinch bolts (front side) "10"

Pinch bolt (front side)
24 Nm (2.4 m·kg, 17 ft·lb)

10. Tighten:
    - Pinch bolts (rear side) "11"

Pinch bolt (rear side)
24 Nm (2.4 m·kg, 17 ft·lb)

TIP

Tighten the pinch bolts (rear side) one at a time, making sure to tighten the first bolt again after tightening the second bolt.

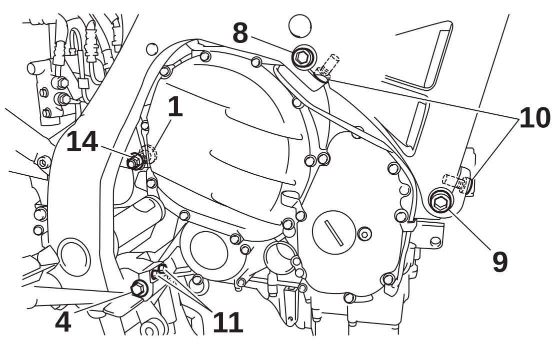
11.Tighten:
- Engine mounting bolts (top) “15” (temporarily tighten)
- Engine bracket bolts (top) “13” (temporarily tighten)

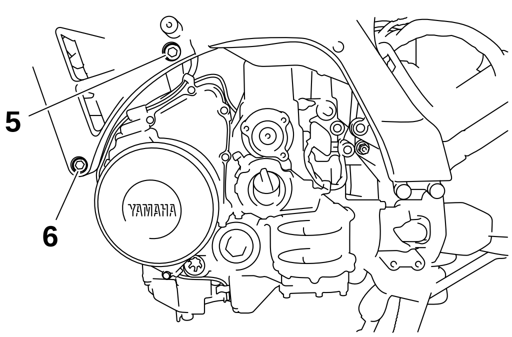
TIP

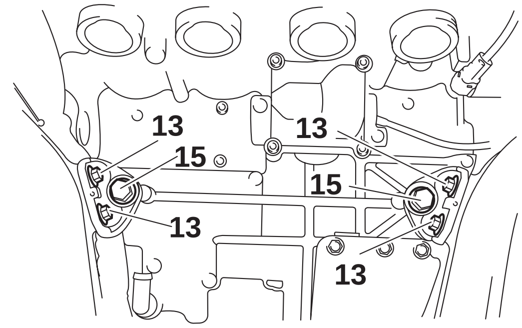
When temporarily tightened, the bolts “15” and “13” should be flat against the engine and frame surface.

12.Tighten:
- Engine mounting bolts (top) “15”
- Engine bracket bolts (top) “13”

Engine mounting bolt (top)
37 Nm (3.7 m·kg, 27 ft·lb)
Engine bracket bolt (top)
16 Nm (1.6 m·kg, 11 ft·lb)







13.Install:
- Engine bracket (left rear side) “1”
- Engine bracket bolt (left rear side) “2”
- Engine mounting bolts (left rear side) “3”

TIP

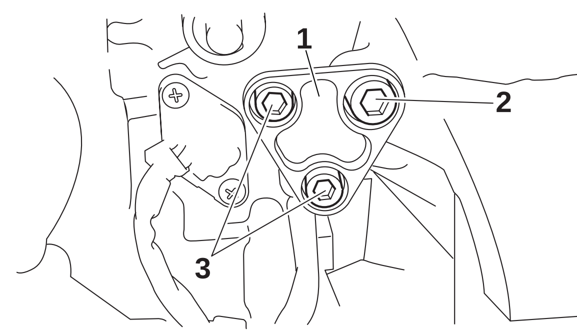
Do not fully tighten the bolts.

14.Tighten:
- Engine bracket bolt (left rear side) “2”

Engine bracket bolt (left rear side)
32 Nm (3.2 m·kg, 23 ft·lb)

15.Tighten:
- Engine mounting bolts (left rear side) “3”

Engine mounting bolt (left rear side)
16 Nm (1.6 m·kg, 11 ft·lb)

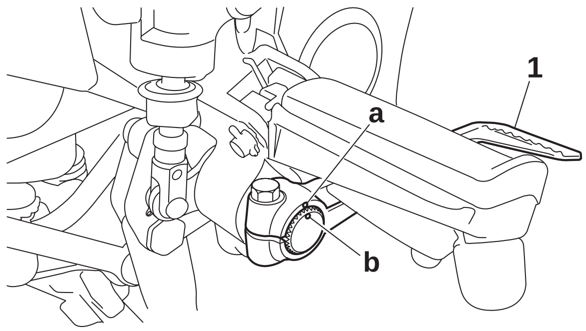


16.Install:
- Brake pedal “1”

Brake pedal pinch bolt
8 Nm (0.8 m·kg, 5.8 ft·lb)

TIP

Align the punch mark “a” on the brake pedal with the punch mark “b” on the brake pedal pivot shaft.



ET3P66035
INSTALLING THE GEAR POSITION SENSOR (FJR13AE only)

1. Connect:
   - MCU coupler
   - ECU coupler

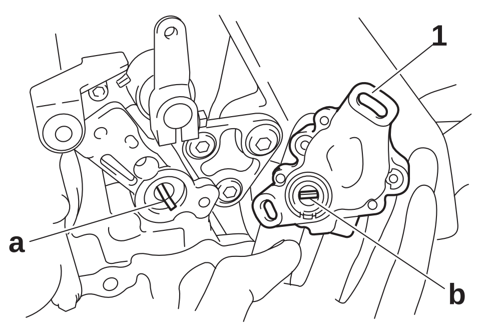
   Refer to “GENERAL CHASSIS” on page 4-1.
2. Install:
   - Gear position sensor “1”

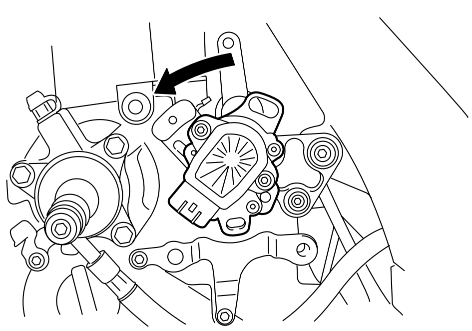
EC3P66001
NOTICE

Shift the transmission into neutral before installing the gear position sensor, otherwise the sensor may be damaged.

TIP

Fit the end “a” of the shift drum assembly into the opening “b” in the gear position sensor “1”, and then rotate the sensor counterclockwise and temporarily install the screws.





3. Adjust:
   - Gear position sensor

   Refer to “ADJUSTING THE GEAR POSITION SENSOR (FJR13AE only)” on page 5-11.

ET3P66036
ADJUSTING THE GEAR POSITION SENSOR (FJR13AE only)

1. Check:
   - Gear position sensor

   Refer to “CHECKING THE GEAR POSITION SENSOR (FJR13AE only)” on page 8-244.
2. Adjust:
   - Gear position sensor angle

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a. Connect the gear position sensor coupler to the gear position sensor.
b. Connect the digital circuit tester to the gear position sensor.

- Positive tester probe → yellow “1”
- Negative tester probe → black/blue “2”

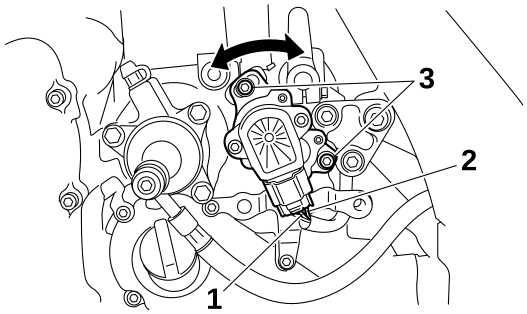
Digital circuit tester
90890-03174
Model 88 Multimeter with tachometer
YU-A1927

c. Turn the main switch to “ON”.
d. Measure the gear position sensor voltage.
e. Adjust the gear position sensor angle so that the voltage is within the specified range.

Output voltage (at neutral position)
FJR13AE 0.71–0.91 V

f. After adjusting the gear position sensor angle, tighten the gear position sensor screws “3” to specification.

Gear position sensor screw
4 Nm (0.4 m·kg, 2.9 ft·lb)
LOCTITE®



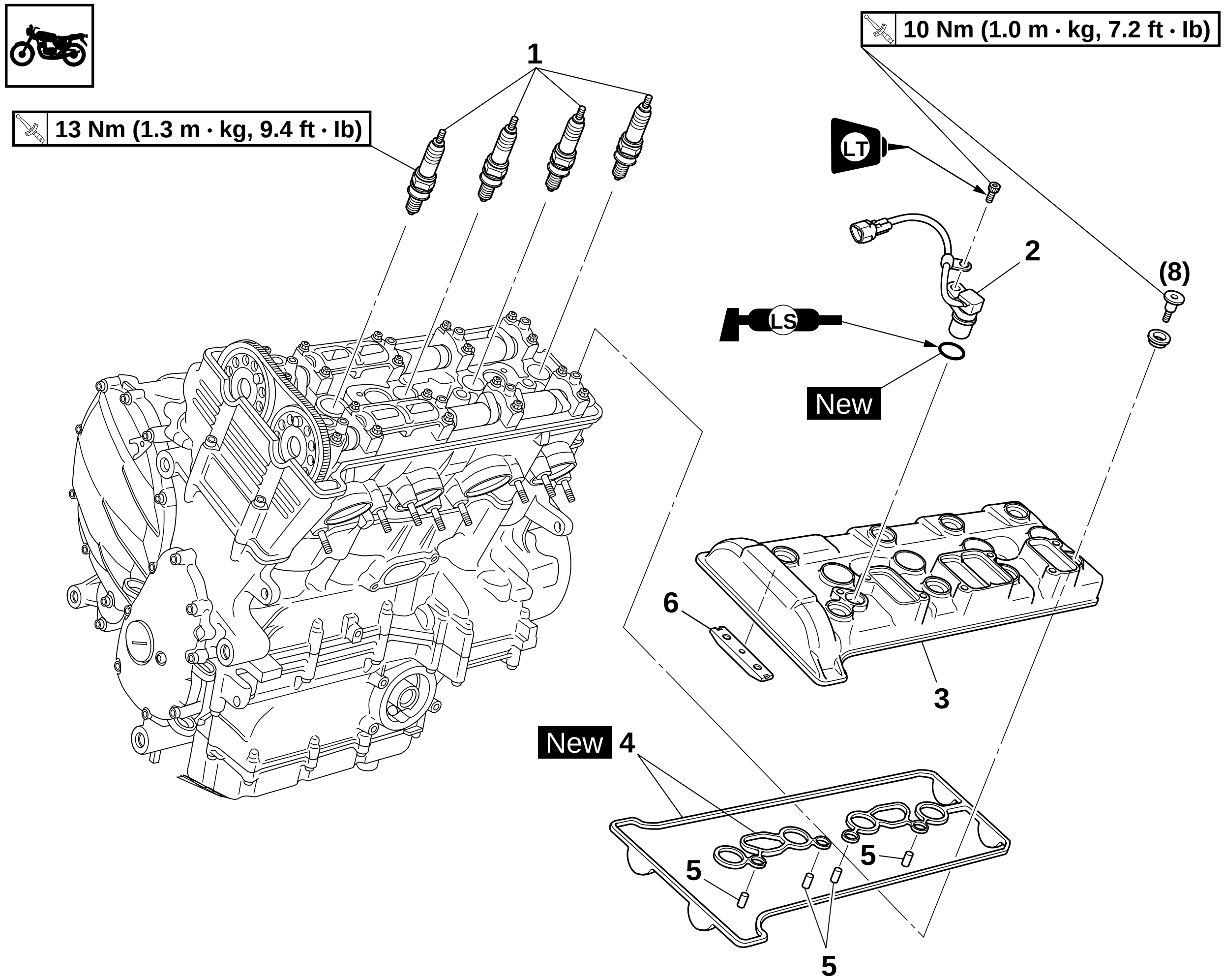
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3. Check:
   - Gear position setting
     Refer to “Diagnostic code table (Diagnostic code No. Sh_ _65)”.

EAS23760

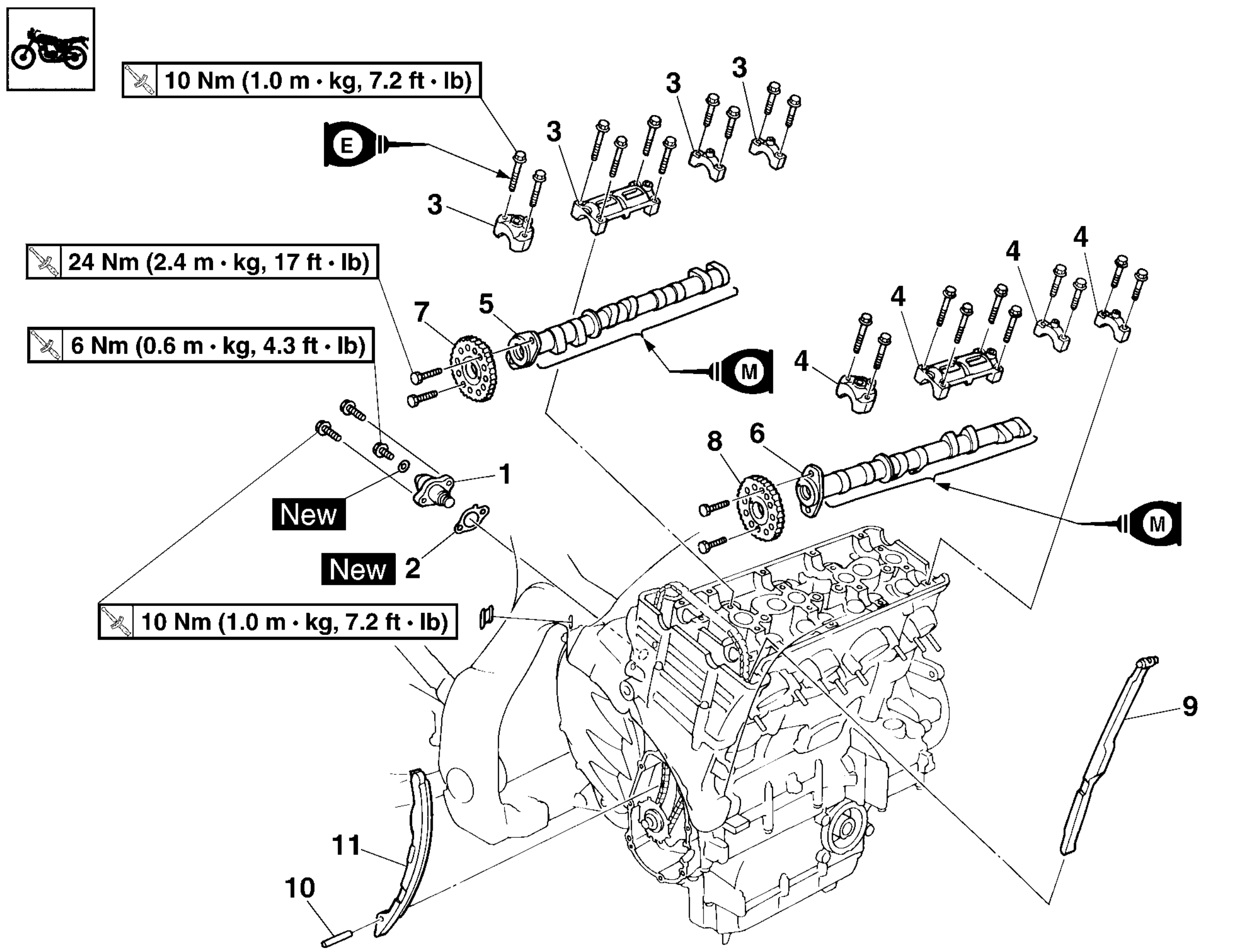
CAMSHAFTS

Removing the cylinder head cover



Order	Job/Parts to remove	Q'ty	Remarks
	Right side cowling		Refer to "GENERAL CHASSIS" on page 4-1.
	Air cut-off valve/Reed valves		Refer to "AIR INDUCTION SYSTEM" on page 7-11.
1	Spark plug	4	
2	Cylinder identification sensor	1	
3	Cylinder head cover	1	
4	Cylinder head cover gasket	1	
5	Dowel pin	4	
6	Timing chain guide (upper side)	1	
			For installation, reverse the removal procedure.

Removing the camshafts



Order	Job/Parts to remove	Q'ty	Remarks
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-5.
	Pickup rotor cover		Refer to "PICKUP ROTOR" on page 5-39.
1	Timing chain tensioner	1	
2	Timing chain tensioner gasket	1	
3	Intake camshaft cap	4	
4	Exhaust camshaft cap	4	
5	Intake camshaft	1	
6	Exhaust camshaft	1	
7	Intake camshaft sprocket	1	
8	Exhaust camshaft sprocket	1	
9	Timing chain guide (exhaust side)	1	
10	Pin	1	
11	Timing chain guide (intake side)	1	
			For installation, reverse the removal procedure.

EAS23810

REMOVING THE CAMSHAFTS

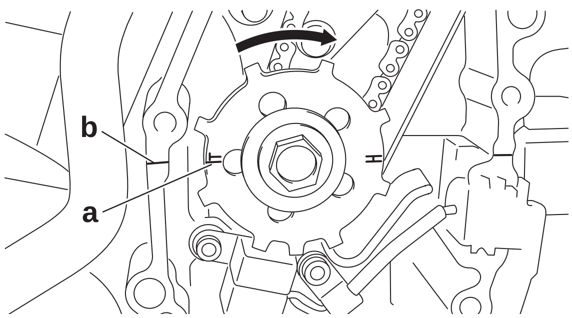
1. Align:
   - "T" mark on the pickup rotor (with the crankcase mating surface)

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a. Turn the crankshaft clockwise.
b. When piston #1 is at TDC on the compression stroke, align the "T" mark "a" on the pickup rotor with the crankcase mating surface "b".

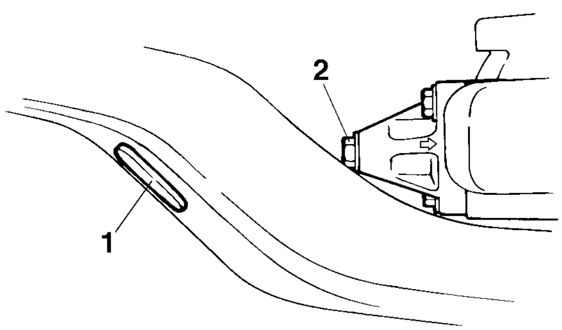
TIP

TDC on the compression stroke can be found when the camshaft lobes are turned away from each other.



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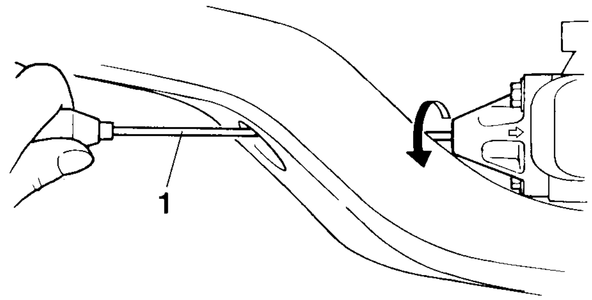
2. Remove:
   - Rubber cap "1"
   - Timing chain tensioner cap bolt "2"
   - Washer



3. Turn the timing chain tensioner rod fully clockwise with a thin screwdriver "1".

TIP

Make sure that the tensioner rod has been fully set clockwise.



4. Remove:
   - Timing chain tensioner
   - Timing chain tensioner gasket
5. Remove:
   - Camshaft caps
   - Dowel pins

ECA13720

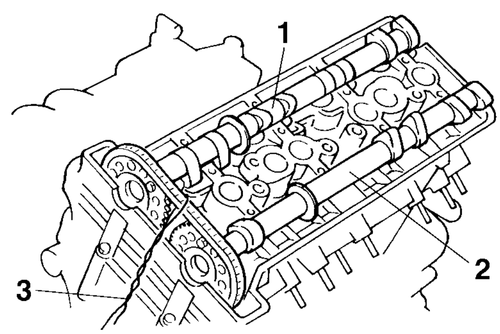
NOTICE

To prevent damage to the cylinder head, camshafts or camshaft caps, loosen the camshaft cap bolts in stages and in a crisscross pattern, working from the outside in.

6. Remove:
   - Intake camshaft "1"
   - Exhaust camshaft "2"

TIP

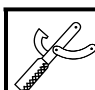
To prevent the timing chain from falling into the crankcase, fasten it with a wire "3".



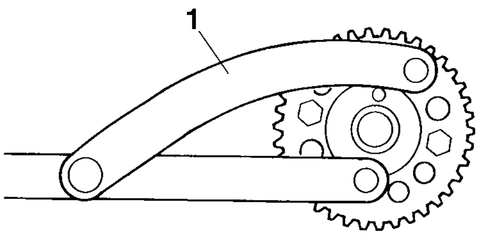
7. Remove:
   - Intake camshaft sprocket
   - Exhaust camshaft sprocket

TIP

While holding the camshaft sprockets with the rotor holding tool "1", loosen the camshaft sprocket bolts.



Rotor holding tool
90890-01235
Universal magneto & rotor holder
YU-01235

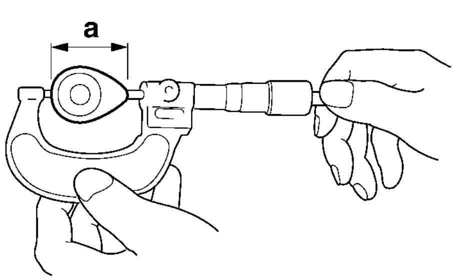


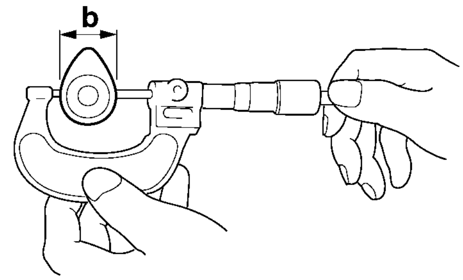
EAS23850

CHECKING THE CAMSHAFTS

1. Check:
   - Camshaft lobes
     Blue discoloration/pitting/scratches → Replace the camshaft.
2. Measure:
   - Camshaft lobe dimensions “a” and “b”
     Out of specification → Replace the camshaft.

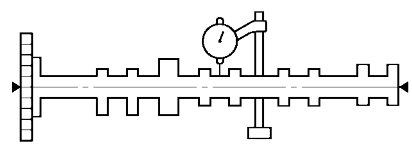
Camshaft lobe dimensions
Intake A
33.050–33.150 mm (1.3012–1.3051 in)
Limit
32.050 mm (1.2618 in)
Intake B
24.997–25.097 mm (0.9841–0.9881 in)
Limit
23.997 mm (0.9448 in)
Exhaust A
33.050–33.150 mm (1.3012–1.3051 in)
Limit
32.950 mm (1.2972 in)
Exhaust B
24.997–25.097 mm (0.9841–0.9881 in)
Limit
24.897 mm (0.9802 in)





3. Measure:
   - Camshaft runout
     Out of specification → Replace.

Camshaft runout limit
0.030 mm (0.0012 in)

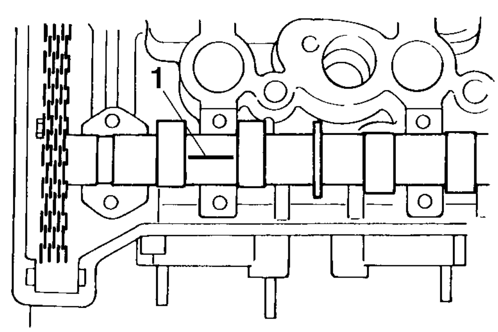


4. Measure:
   - Camshaft-journal-to-camshaft-cap clearance
     Out of specification → Measure the camshaft journal diameter.

Camshaft-journal-to-camshaft-cap clearance
0.028–0.062 mm (0.0011–0.0024 in)

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a. Install the camshaft into the cylinder head (without the dowel pins and camshaft caps).
b. Position a strip of Plastigauge® “1” onto the camshaft journal as shown.



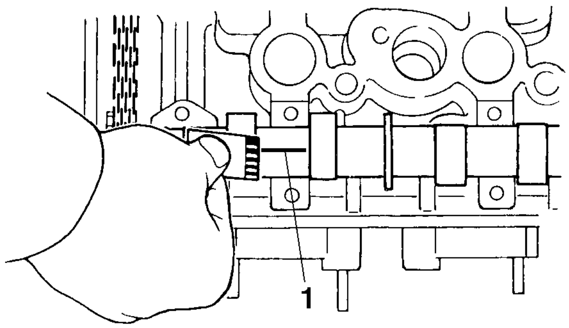
c. Install the dowel pins and camshaft caps.

TIP

- Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.
- Do not turn the camshaft when measuring the camshaft journal-to-camshaft cap clearance with the Plastigauge®.

Camshaft cap bolt
10 Nm (1.0 m·kg, 7.2 ft·lb)

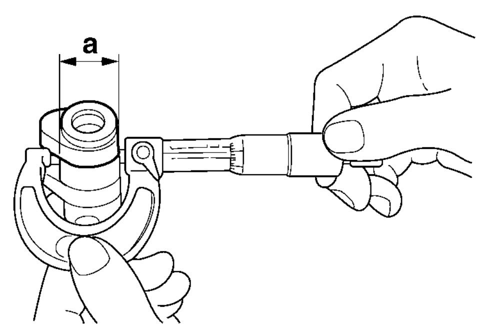
d. Remove the camshaft caps and then measure the width of the Plastigauge® "1".



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5. Measure:
   - Camshaft journal diameter "a"
     Out of specification → Replace the camshaft.
     Within specification → Replace the cylinder head and the camshaft caps as a set.

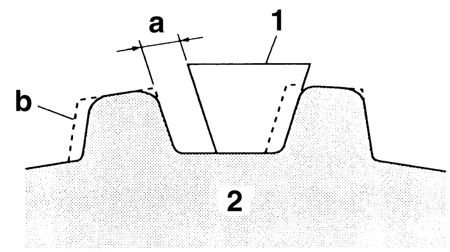
Camshaft journal diameter
24.459–24.472 mm (0.9630–0.9635 in)



EAS23870

CHECKING THE CAMSHAFT SPROCKETS

1. Check:
   - Camshaft sprockets
     More than 1/4 tooth wear "a" → Replace the camshaft sprockets, timing chain, and crankshaft as a set.



a. 1/4 tooth
b. Correct
1. Timing chain roller
2. Camshaft sprocket

EAS23950

CHECKING THE TIMING CHAIN GUIDES

1. Check:
   - Timing chain guide (exhaust side)
   - Timing chain guide (intake side)
   - Timing chain guide (upper side)
     Damage/wear → Replace the defective part(s).

EAS23970

CHECKING THE TIMING CHAIN TENSIONER

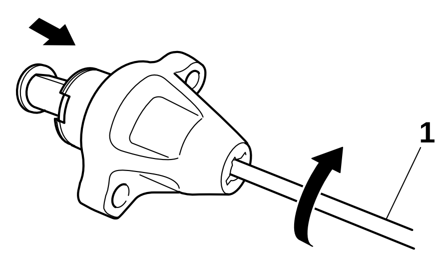
1. Check:
   - Timing chain tensioner
     Cracks/damage/rough movement → Replace.

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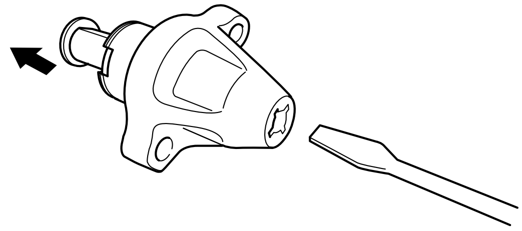
a. Lightly press the timing chain tensioner rod into the timing chain tensioner housing by hand.

TIP

While pressing the timing chain tensioner rod, wind it clockwise with a thin screwdriver "1" until it stops.



b. Remove the screwdriver and slowly release the timing chain tensioner rod.
c. Make sure that the timing chain tensioner rod comes out of the timing chain tensioner housing smoothly. If there is rough movement, replace the timing chain tensioner.



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EAS24010

INSTALLING THE CAMSHAFTS

1. Install:
   - Exhaust camshaft sprocket
   - Intake camshaft sprocket

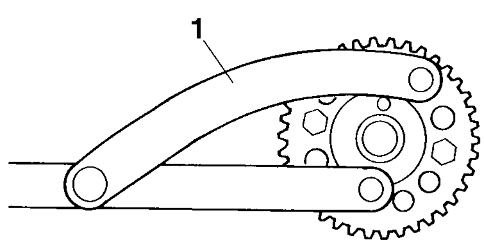
	Camshaft sprocket bolt **24 Nm (2.4 m·kg, 17 ft·lb)**

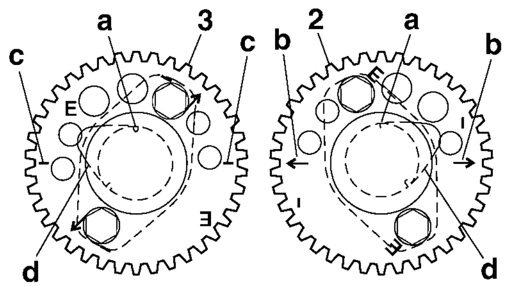
TIP

- While holding the camshaft sprockets with the rotor holding tool "1", tighten the camshaft sprocket bolts.
- Make sure that the holes "a" in the cylinder-#4 cam and match marks "b" and "c" on the camshaft sprockets are in the position shown in the illustration.

  2: Exhaust camshaft sprocket
  3: Intake camshaft sprocket
  b: Exhaust side "→"
  c: Intake side "—"
  d: Cylinder-#1 cam

	Rotor holding tool **90890-01235** **Universal magneto & rotor holder** **YU-01235**





2. Install:
   - Timing chain "1"
   - Exhaust camshaft "2"
   - Intake camshaft "3"
   (with the camshaft sprockets)

ECA13740

NOTICE

Do not turn the crankshaft when installing the camshaft(s) to avoid damage or improper valve timing.

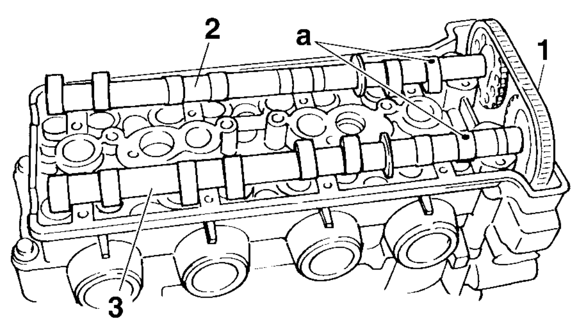
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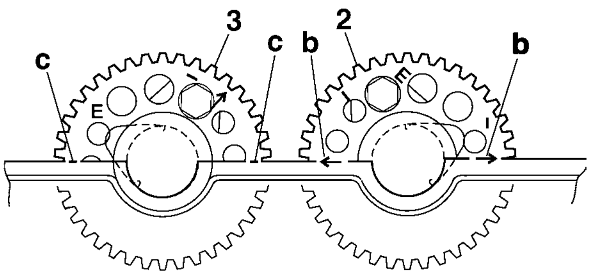
a. Install the timing chain onto both camshaft sprockets, and then install the camshafts.

TIP

- Make sure the holes "a" on each camshaft faces up.
- When installing the timing chain, start with the exhaust camshaft and be sure to keep the timing chain as tight as possible on the exhaust side.
- Make sure the match marks "b" and "c" on the camshaft sprockets are aligned with the cylinder head edge.

  b: Exhaust side "→"
  c: Intake side "—"



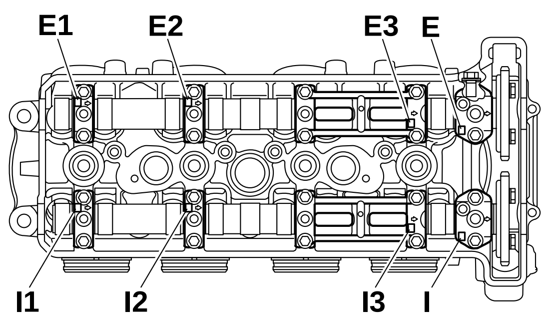


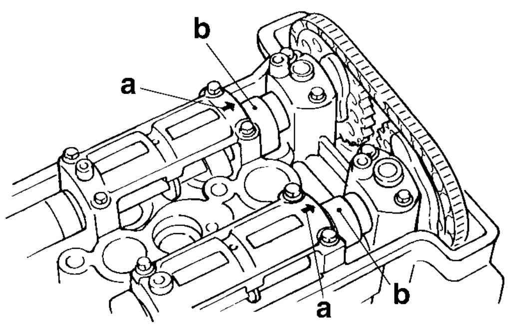
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3. Install:
   - Exhaust camshaft caps
   - Intake camshaft caps

TIP

- Make sure each camshaft cap is installed in its original place. Refer to the identification marks as follows:
  "E", "E1", "E2", "E3": Exhaust
  "I", "I1", "I2", "I3": Intake
- Make sure the arrow mark "a" on each camshaft points towards the right side of the engine.
- Make sure the holes "b" in the camshafts are aligned with arrow mark "a" on the camshaft caps.





4. Install:
   - Camshaft cap bolts

(torque)	**Camshaft cap bolt** **10 Nm (1.0 m·kg, 7.2 ft·lb)**

ECA13730

NOTICE

The camshaft cap bolts must be tightened evenly or damage to the cylinder head, camshaft caps, and camshafts will result.

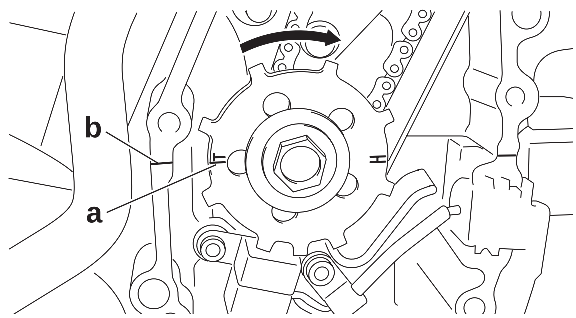
TIP

Tighten the camshaft cap bolts in stages and in a crisscross pattern, working from the inner caps out.

5. Align:
   - "T" mark on the pickup rotor
     (with the crankcase mating surface)

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a. Turn the crankshaft clockwise.
b. When piston #1 is at TDC on the compression stroke, align the "T" mark "a" on the pickup rotor with the crankcase mating surface "b".



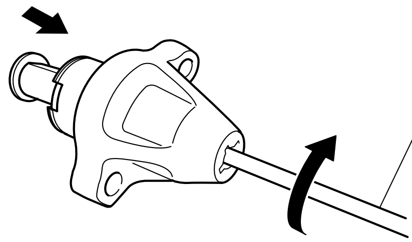
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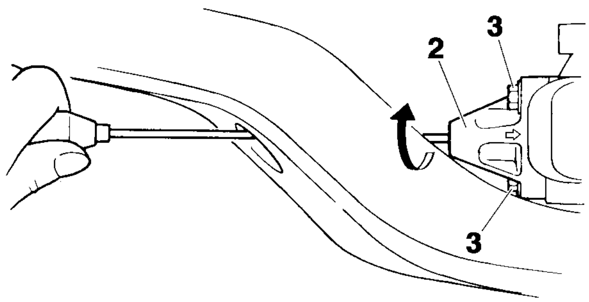
6. Install:
   - Timing chain tensioner
   - Timing chain tensioner gasket **New**

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a. While lightly pressing the timing chain tensioner rod by hand, turn the tensioner rod fully clockwise with a thin screwdriver "1".
b. With the timing chain tensioner rod turned all the way into the timing chain tensioner housing (with the thin screwdriver still installed), install the gasket and the timing chain tensioner "2" onto the cylinder block.
c. Tighten the timing chain tensioner bolts "3" to the specified torque.

(torque)	**Timing chain tensioner bolt** **10 Nm (1.0 m·kg, 7.2 ft·lb)**



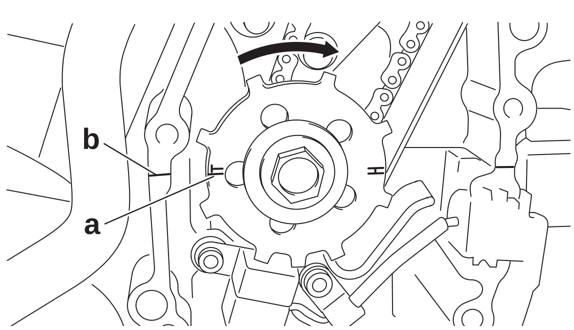


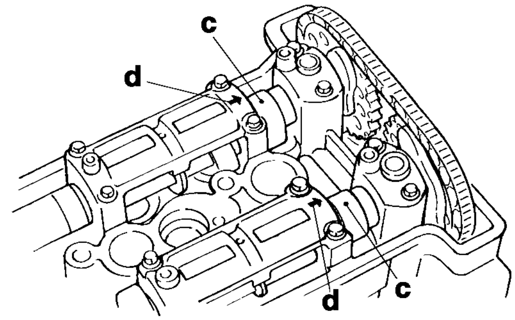
d. Remove the screwdriver, make sure the timing chain tensioner rod releases, and then tighten the cap bolt to the specified torque.

Timing chain tensioner cap bolt
6 Nm (0.6 m·kg, 4.3 ft·lb)

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7. Turn:
   - Crankshaft
     (several turns clockwise)
8. Check:
   - "T" mark
     Make sure the "T" mark "a" on the pickup rotor is aligned with the crankcase mating surface "b".
   - Camshaft holes
     Make sure the holes "c" in the camshafts are aligned with the arrow marks "d" on the camshaft caps.
     Out of alignment → Adjust.
     Refer to the installation steps above.





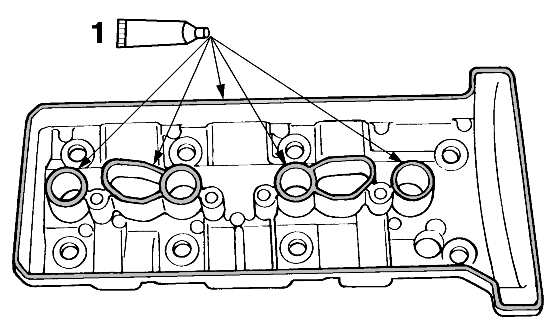
9. Measure:
   - Valve clearance
     Out of specification → Adjust.
     Refer to "ADJUSTING THE VALVE CLEARANCE" on page 3-6.
10. Install:
   - Cylinder head cover gasket **New**
   - Cylinder head cover

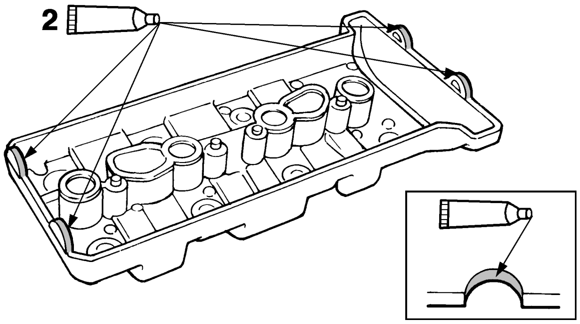
Cylinder head cover bolt
10 Nm (1.0 m·kg, 7.2 ft·lb)

TIP

- Apply Three Bond 1514® "1" onto the mating surfaces of the cylinder head cover and cylinder head cover gasket.
- Apply Yamaha bond No.1215 "2" onto the mating surfaces of the cylinder head cover gasket and cylinder head.
- Tighten the cylinder head cover bolts in stages and in a crisscross pattern.

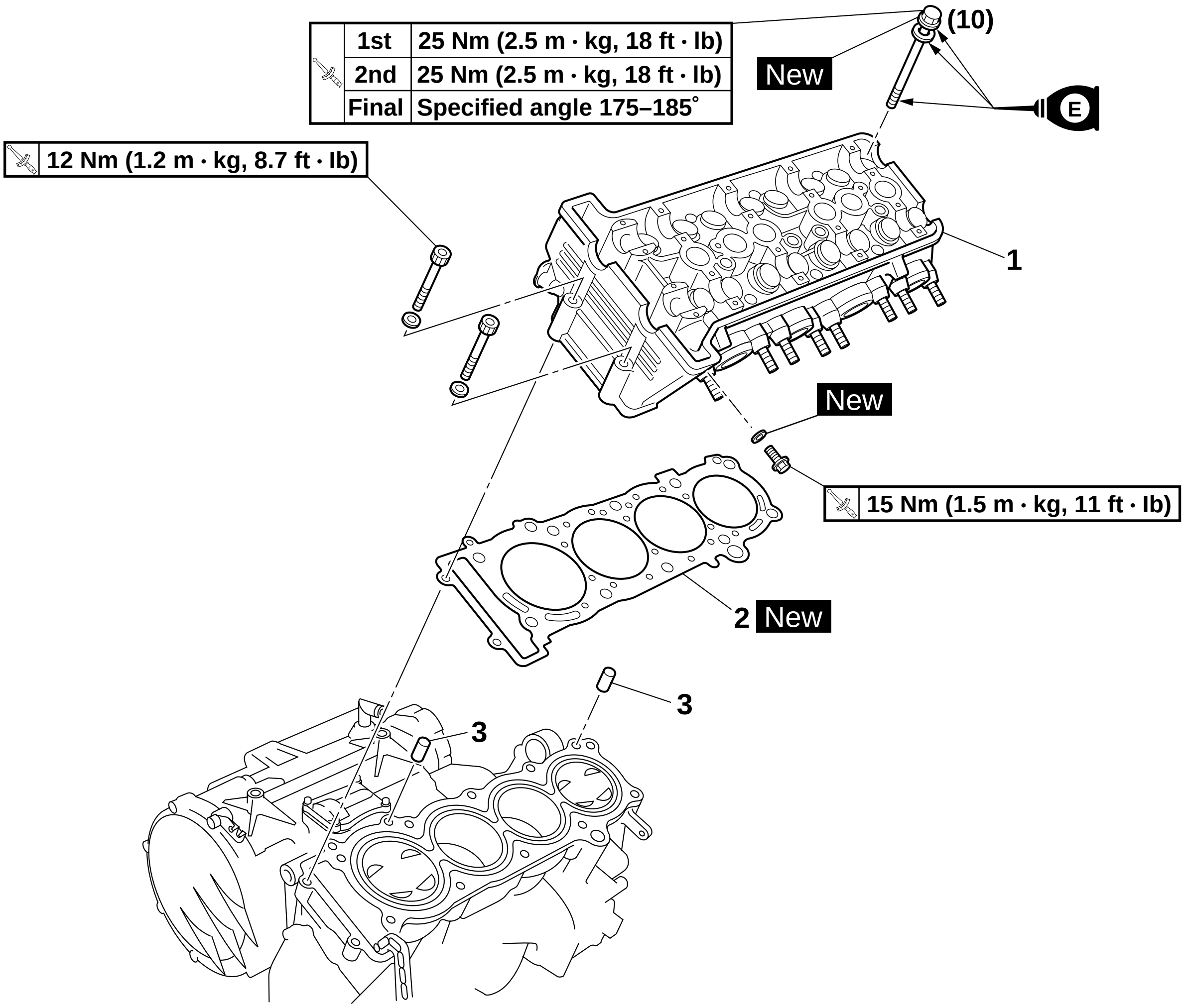
Yamaha bond No. 1215
90890-85505
(Three Bond No.1215®)




2

EAS24100
CYLINDER HEAD

Removing the cylinder head



Order	Job/Parts to remove	Q’ty	Remarks
	Engine		Refer to “ENGINE REMOVAL” on page 5-1.
	Camshafts		Refer to “CAMSHAFTS” on page 5-13.
1	Cylinder head	1	
2	Cylinder head gasket	1	
3	Dowel pin	2	
			For installation, reverse the removal procedure.

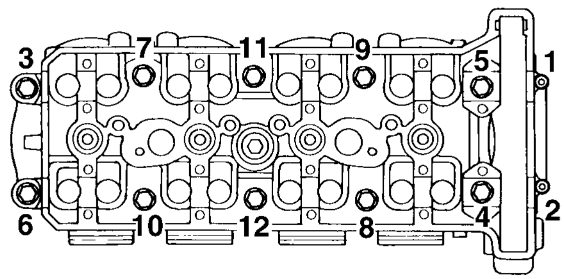
EAS24120

REMOVING THE CYLINDER HEAD

1. Remove:
   - Cylinder head bolts

TIP

- Loosen the bolts in the proper sequence as shown.
- Loosen each bolt 1/2 of a turn at a time. After all of the bolts are fully loosened, remove them.



EAS24160

CHECKING THE CYLINDER HEAD

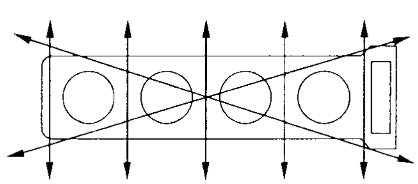
1. Eliminate:
   - Combustion chamber carbon deposits (with a rounded scraper)

TIP

Do not use a sharp instrument to avoid damaging or scratching:
- Spark plug bore threads
- Valve seats

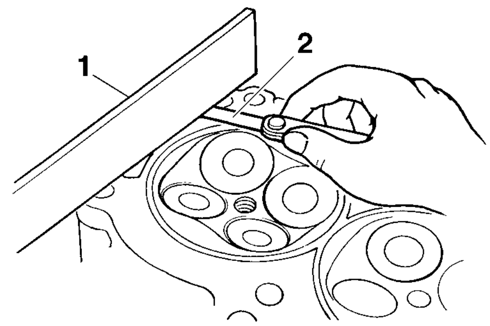
2. Check:
   - Cylinder head
     Damage/scratches → Replace.
   - Cylinder head water jacket
     Mineral deposits/rust → Eliminate.
3. Measure:
   - Cylinder head warpage
     Out of specification → Resurface the cylinder head.

Warpage limit
0.10 mm (0.0039 in)



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a. Place a straightedge “1” and a thickness gauge “2” across the cylinder head.



b. Measure the warpage.
c. If the limit is exceeded, resurface the cylinder head as follows.
d. Place a 400–600 grit wet sandpaper on the surface plate and resurface the cylinder head using a figure-eight sanding pattern.

TIP

To ensure an even surface, rotate the cylinder head several times.

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EAS24240

INSTALLING THE CYLINDER HEAD

1. Install:
   - Cylinder head

TIP

Pass the timing chain through the timing chain cavity.

2. Tighten:
   - Cylinder head bolts (M10) “1”–“10” **New**
   - Cylinder head bolts (M6) “11”, “12”

EW3P61013

⚠ WARNING

Replace the bolts with new ones.

TIP

Tighten the bolts using the following procedure.

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a. Lubricate the cylinder head bolts and washers with engine oil.
b. Install the washers and cylinder head bolts.
c. Tighten the cylinder head bolts (M10) in the proper tightening sequence as shown.

Cylinder head bolt (M10)
1st
25 Nm (2.5 m·kg, 18 ft·lb)

d. Loosen and retighten the cylinder head bolts in the proper tightening sequence as shown.

Cylinder head bolt (M10)
2nd
25 Nm (2.5 m·kg, 18 ft·lb)

e. Tighten the cylinder head bolts further to reach the specified angle 175–185° in the proper tightening sequence as shown.

Cylinder head bolt (M10)
Final
Specified angle 175–185°

EW3P61014

WARNING

If the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Instead, replace the bolt with a new one and perform the procedure again.

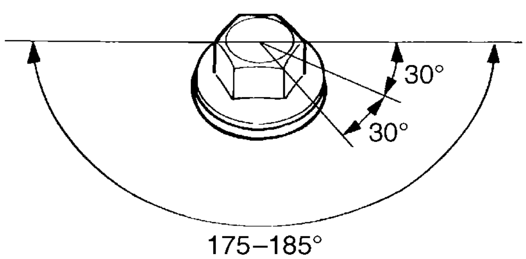
EC3P61033

NOTICE

- **Do not use a torque wrench to tighten the bolt to the specified angle.**
- **Tighten the bolt until it is at the specified angle.**

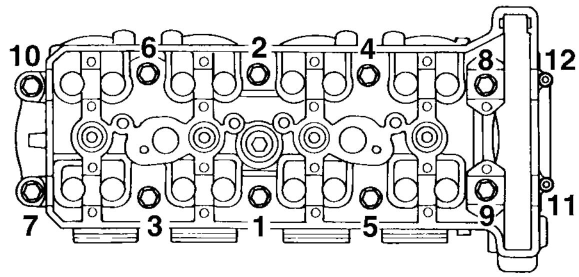
TIP

On a hexagonal bolt, note that the angle from one corner to another is 60°.



f. Tighten the cylinder head bolts (M6) in proper tightening sequence as shown.

Cylinder head bolt (M6)
12 Nm (1.2 m·kg, 8.7 ft·lb)

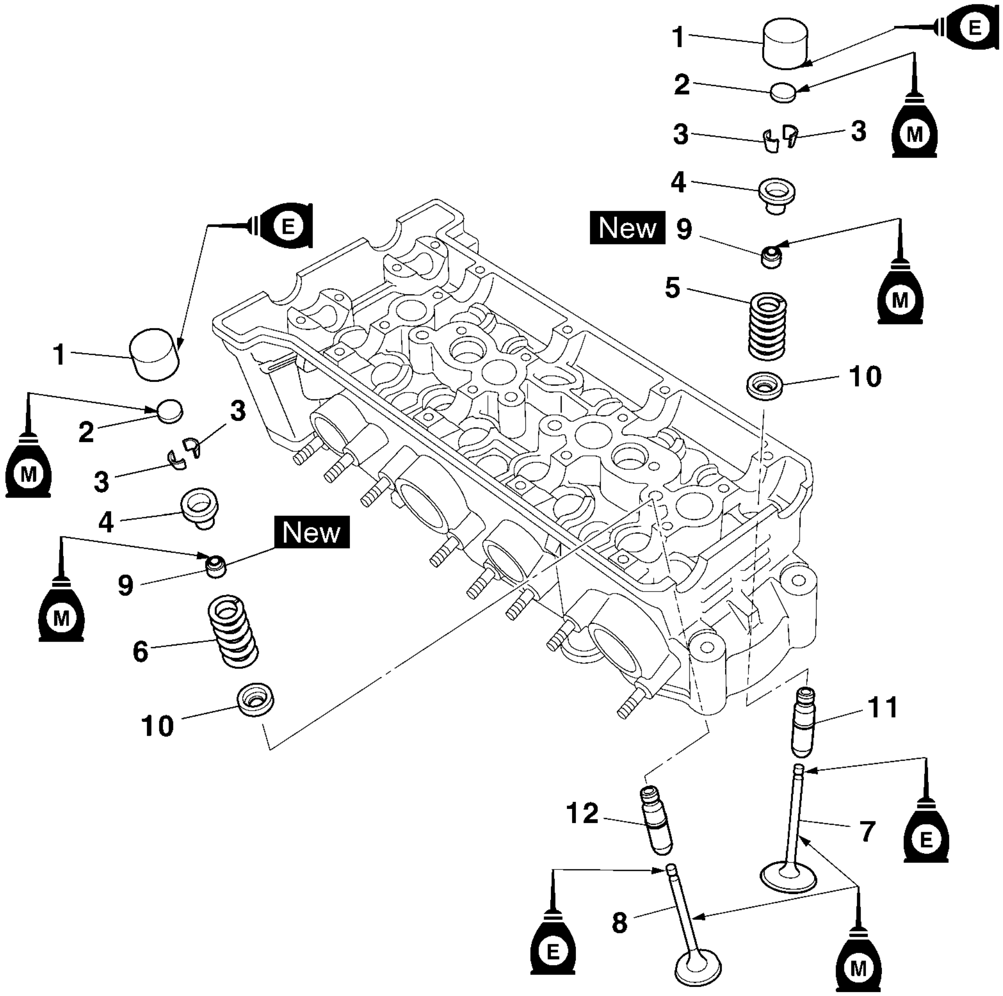


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EAS24270

VALVES AND VALVE SPRINGS

Removing the valves and valve springs



Order	Job/Parts to remove	Q'ty	Remarks
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-22.
1	Valve lifter	16	
2	Valve pad	16	
3	Valve cotter	32	
4	Upper spring seat	16	
5	Intake valve spring	8	
6	Exhaust valve spring	8	
7	Intake valve	8	
8	Exhaust valve	8	
9	Valve stem seal	16	
10	Lower spring seat	16	
11	Intake valve guide	8	
12	Exhaust valve guide	8	
			For installation, reverse the removal procedure.

EAS24280

REMOVING THE VALVES

The following procedure applies to all of the valves and related components.

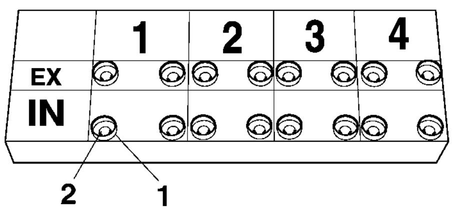
TIP

Before removing the internal parts of the cylinder head (e.g., valves, valve springs, valve seats), make sure the valves properly seal.

1. Remove:
   - Valve lifter “1”
   - Valve pad “2”

TIP

Make a note of the position of each valve lifter and valve pad so that they can be reinstalled in their original place.



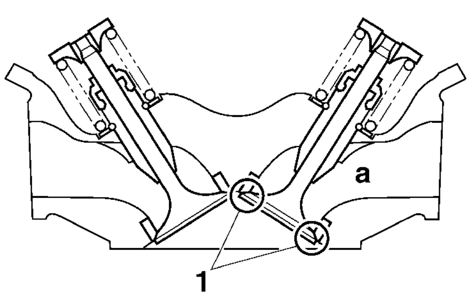
2. Check:
   - Valve sealing
     Leakage at the valve seat → Check the valve face, valve seat, and valve seat width.
     Refer to “CHECKING THE VALVE SEATS” on page 5-28.

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a. Pour a clean solvent “a” into the intake and exhaust ports.
b. Check that the valves properly seal.

TIP

There should be no leakage at the valve seat “1”.



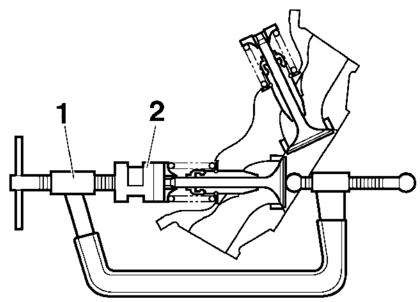
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3. Remove:
   - Valve cotters

TIP

Remove the valve cotters by compressing the valve spring with the valve spring compressor “1” and the valve spring compressor attachment “2”.

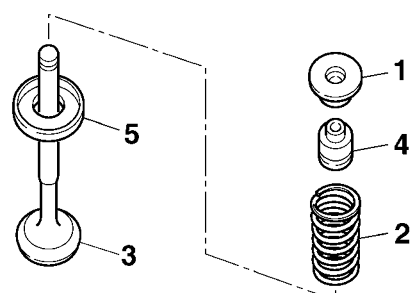
Valve spring compressor **90890-04019** **YM-04019** **Valve spring compressor attachment** **90890-04114** **Valve spring compressor adapter 19.5 mm** **YM-04114**



4. Remove:
   - Upper spring seat “1”
   - Valve spring “2”
   - Valve “3”
   - Valve stem seal “4”
   - Lower spring seat “5”

TIP

Identify the position of each part very carefully so that it can be reinstalled in its original place.



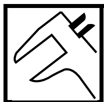
EAS24290

CHECKING THE VALVES AND VALVE GUIDES

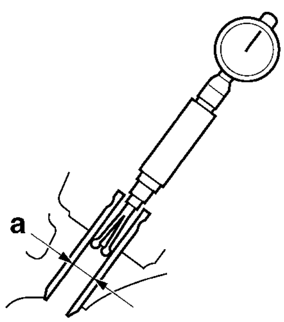
The following procedure applies to all of the valves and valve guides.

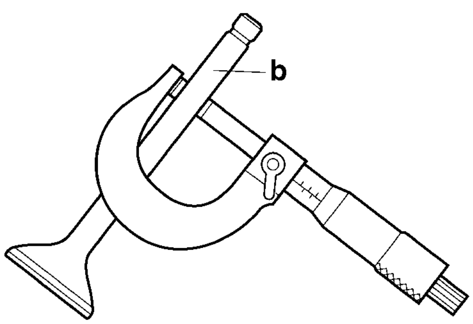
1. Measure:
   - Valve-stem-to-valve-guide clearance
     Out of specification → Replace the valve guide.

• Valve-stem-to-valve-guide clearance = Valve guide inside diameter “a” - Valve stem diameter “b”



Valve-stem-to-valve-guide clearance (intake)
0.010–0.037 mm (0.0004–0.0015 in)
Limit
0.080 mm (0.0032 in)
Valve-stem-to-valve-guide clearance (exhaust)
0.020–0.047 mm (0.0008–0.0019 in)
Limit
0.105 mm (0.0041 in)





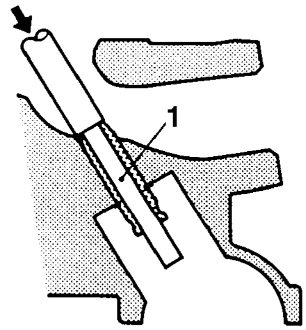
2. Replace:
   - Valve guide

TIP

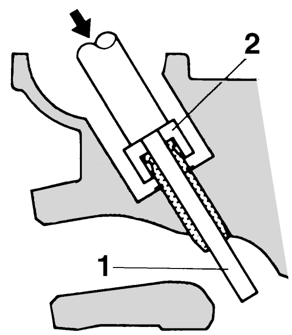
To ease valve guide removal and installation, and to maintain the correct fit, heat the cylinder head to 100 °C (212 °F) in an oven.

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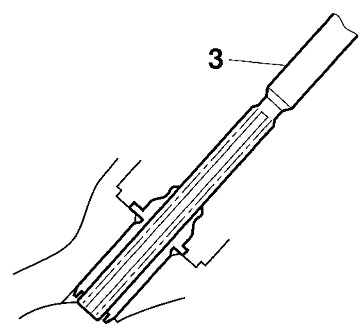
a. Remove the valve guide with the valve guide remover “1”.



b. Install the new valve guide with the valve guide installer “2” and valve guide remover “1”.



c. After installing the valve guide, bore the valve guide with the valve guide reamer “3” to obtain the proper valve-stem-to-valve-guide clearance.



TIP

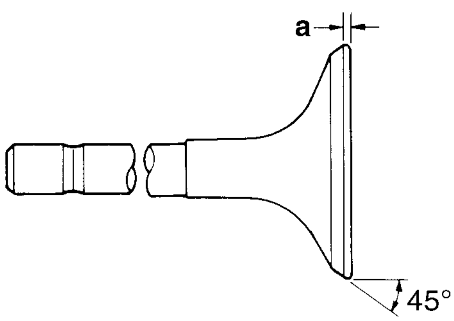
After replacing the valve guide, reface the valve seat.

Valve guide remover (ø5)
90890-04097
Valve guide remover (5.0 mm)
YM-04097
Valve guide installer (ø5)
90890-04098
Valve guide installer (5.0 mm)
YM-04098
Valve guide reamer (ø5)
90890-04099
Valve guide reamer (5.0 mm)
YM-04099

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3. Eliminate:
   - Carbon deposits
     (from the valve face and valve seat)
4. Check:
   - Valve face
     Pitting/wear → Grind the valve face.
   - Valve stem end
     Mushroom shape or diameter larger than the body of the valve stem → Replace the valve.
5. Measure:
   - Valve margin thickness D “a”
     Out of specification → Replace the valve.

Valve margin thickness D (intake)
0.80–1.20 mm (0.0315–0.0472 in)
Valve margin thickness D (exhaust)
0.50–0.90 mm (0.0197–0.0354 in)

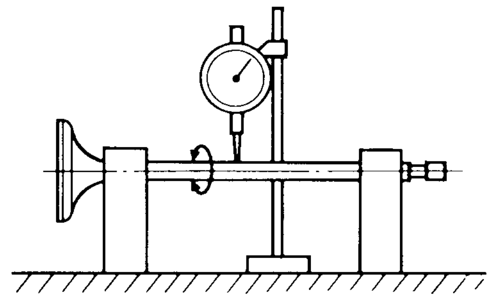


6. Measure:
   - Valve stem runout
     Out of specification → Replace the valve.

TIP

- When installing a new valve, always replace the valve guide.
- If the valve is removed or replaced, always replace the valve stem seal.

Valve stem runout
0.010 mm (0.0004 in)



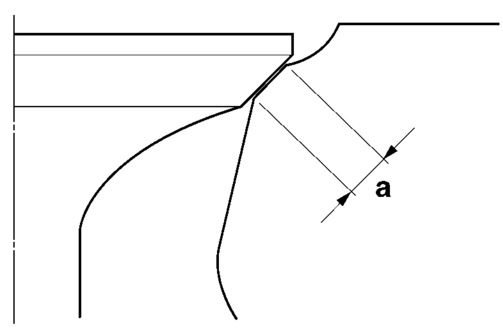
EAS24300

CHECKING THE VALVE SEATS

The following procedure applies to all of the valves and valve seats.

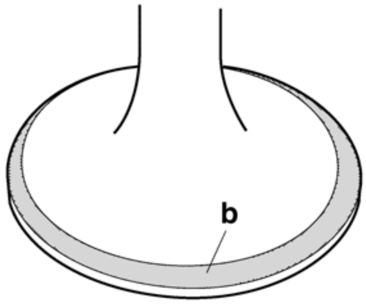
1. Eliminate:
   - Carbon deposits
     (from the valve face and valve seat)
2. Check:
   - Valve seat
     Pitting/wear → Replace the cylinder head.
3. Measure:
   - Valve seat width C “a”
     Out of specification → Replace the cylinder head.

Valve seat width C (intake)
0.90–1.10 mm (0.0354–0.0433 in)
Valve seat width C (exhaust)
0.90–1.10 mm (0.0354–0.0433 in)



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a. Apply Mechanic’s blueing dye (Dykem) “b” onto the valve face.



b. Install the valve into the cylinder head.
c. Press the valve through the valve guide and onto the valve seat to make a clear impression.
d. Measure the valve seat width.

TIP

Where the valve seat and valve face contacted one another, the blueing will have been removed.

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4. Lap:
   - Valve face
   - Valve seat

TIP

After replacing the cylinder head or replacing the valve and valve guide, the valve seat and valve face should be lapped.

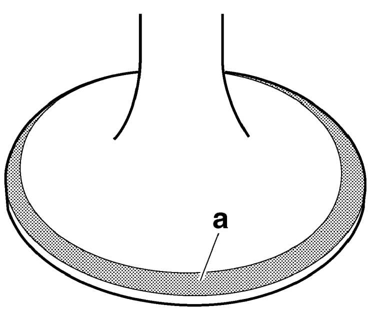
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a. Apply a coarse lapping compound "a" to the valve face.

ECA13790

NOTICE

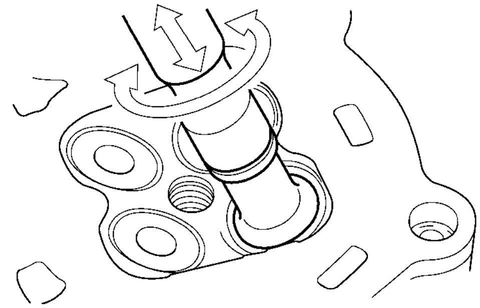
Do not let the lapping compound enter the gap between the valve stem and the valve guide.



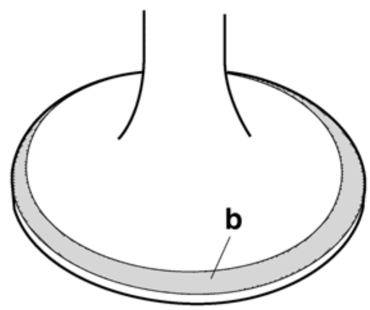
b. Apply molybdenum disulfide oil onto the valve stem.
c. Install the valve into the cylinder head.
d. Turn the valve until the valve face and valve seat are evenly polished, then clean off all of the lapping compound.

TIP

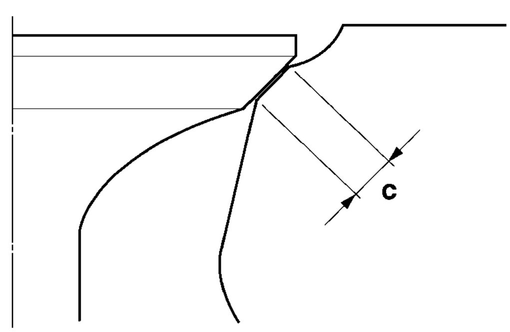
For the best lapping results, lightly tap the valve seat while rotating the valve back and forth between your hands.



e. Apply a fine lapping compound to the valve face and repeat the above steps.
f. After every lapping procedure, be sure to clean off all of the lapping compound from the valve face and valve seat.
g. Apply Mechanic's blueing dye (Dykem) "b" onto the valve face.



h. Install the valve into the cylinder head.
i. Press the valve through the valve guide and onto the valve seat to make a clear impression.
j. Measure the valve seat width "c" again. If the valve seat width is out of specification, reface and lap the valve seat.



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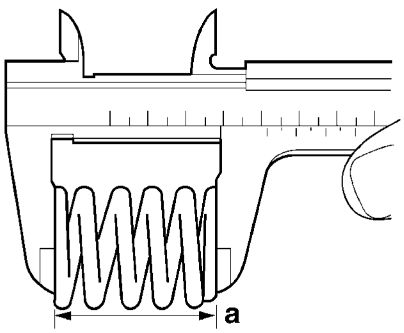
EAS24310

CHECKING THE VALVE SPRINGS

The following procedure applies to all of the valve springs.

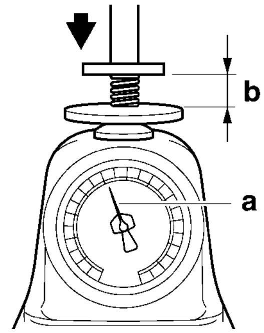
1. Measure:
   - Valve spring free length “a”
     Out of specification → Replace the valve spring.

Free length (intake)
39.73 mm (1.56 in)
Limit
37.74 mm (1.49 in)
Free length (exhaust)
39.73 mm (1.56 in)
Limit
37.74 mm (1.49 in)



2. Measure:
   - Compressed valve spring force “a”
     Out of specification → Replace the valve spring.

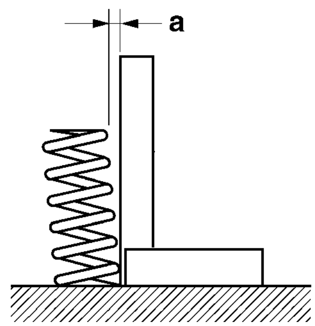
Installed compression spring force (intake)
136.00–158.00 N (30.57–35.52 lb) (13.87–16.11 kgf)
Installed compression spring force (exhaust)
136.00–158.00 N (30.57–35.52 lb) (13.87–16.11 kgf)
Installed length (intake)
33.00 mm (1.30 in)
Installed length (exhaust)
33.00 mm (1.30 in)



b. Installed length

3. Measure:
   - Valve spring tilt “a”
     Out of specification → Replace the valve spring.

Spring tilt (intake)
2.5°/1.7 mm (2.5°/0.067 in)
Spring tilt (exhaust)
2.5°/1.7 mm (2.5°/0.067 in)



EAS24320

CHECKING THE VALVE LIFTERS

The following procedure applies to all of the valve lifters.

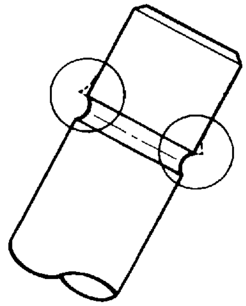
1. Check:
   - Valve lifter
     Damage/scratches → Replace the valve lifters and cylinder head.

EAS24340

INSTALLING THE VALVES

The following procedure applies to all of the valves and related components.

1. Deburr:
   - Valve stem end
     (with an oil stone)

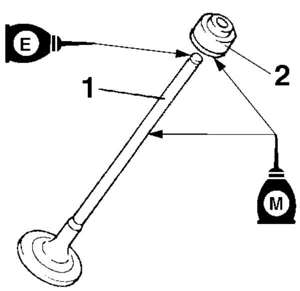


2. Lubricate:
   - Valve stem “1”
   - Valve stem seal “2”
   (with the recommended lubricant)

Recommended lubricant
Molybdenum disulfide oil

3. Lubricate:
   - Valve stem end
   (with the recommended lubricant)

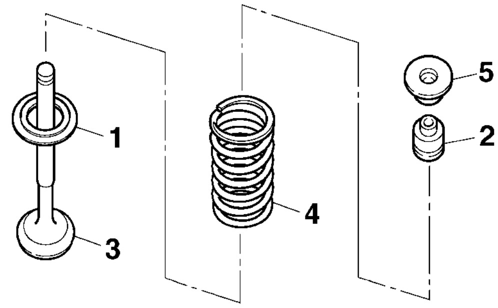
Recommended lubricant
Engine oil

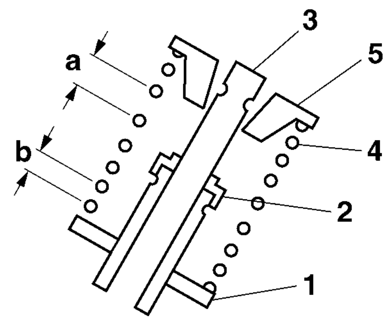


4. Install:
   - Lower spring seat “1”
   - Valve stem seal “2” New
   - Valve “3”
   - Valve spring “4”
   - Upper spring seat “5”
   (into the cylinder head)

TIP

- Make sure each valve is installed in its original place.
- Install the valve springs with the larger pitch “a” facing up.





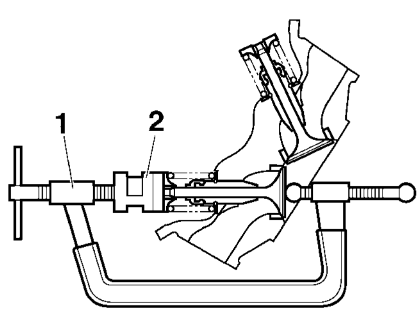
b. Smaller pitch

5. Install:
   - Valve cotters

TIP

Install the valve cotters by compressing the valve spring with the valve spring compressor “1” and the valve spring compressor attachment “2”.

Valve spring compressor
90890-04019
YM-04019
Valve spring compressor attachment
90890-04114
Valve spring compressor adapter 19.5 mm
YM-04114

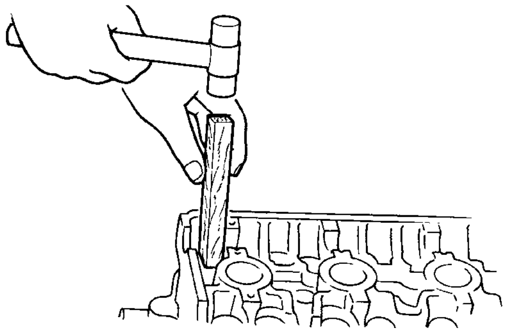


6. To secure the valve cotters onto the valve stem, lightly tap the valve tip with a soft-face hammer.

ECA13800

NOTICE

Hitting the valve tip with excessive force could damage the valve.



7. Lubricate:
   - Valve lifter
     (with the recommended lubricant)

	**Recommended lubricant** **Engine oil**

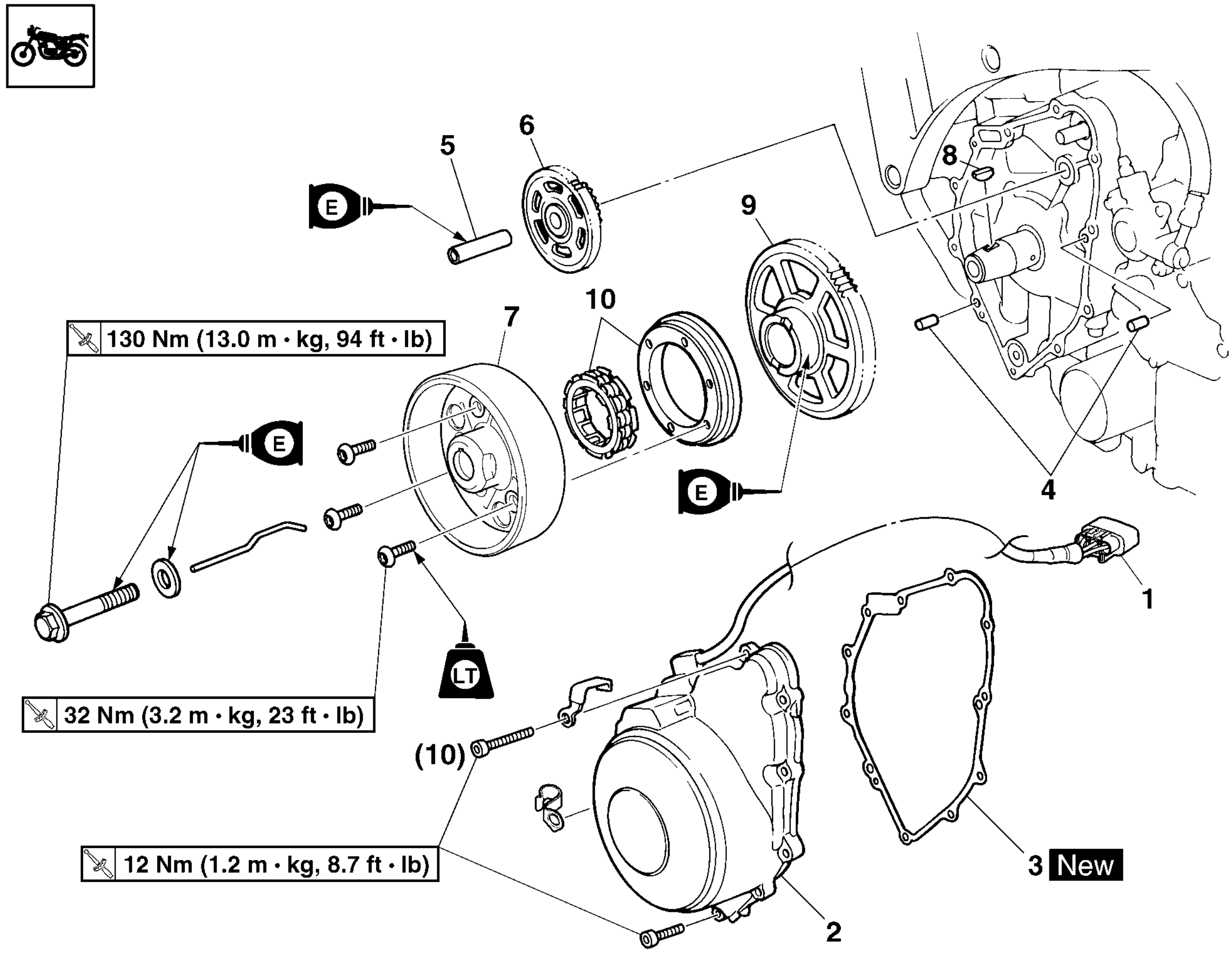
8. Install:
   - Valve pad
   - Valve lifter

TIP

- The valve lifter must move smoothly when rotated with a finger.
- Each valve lifter and valve pad must be reinstalled in its original position.

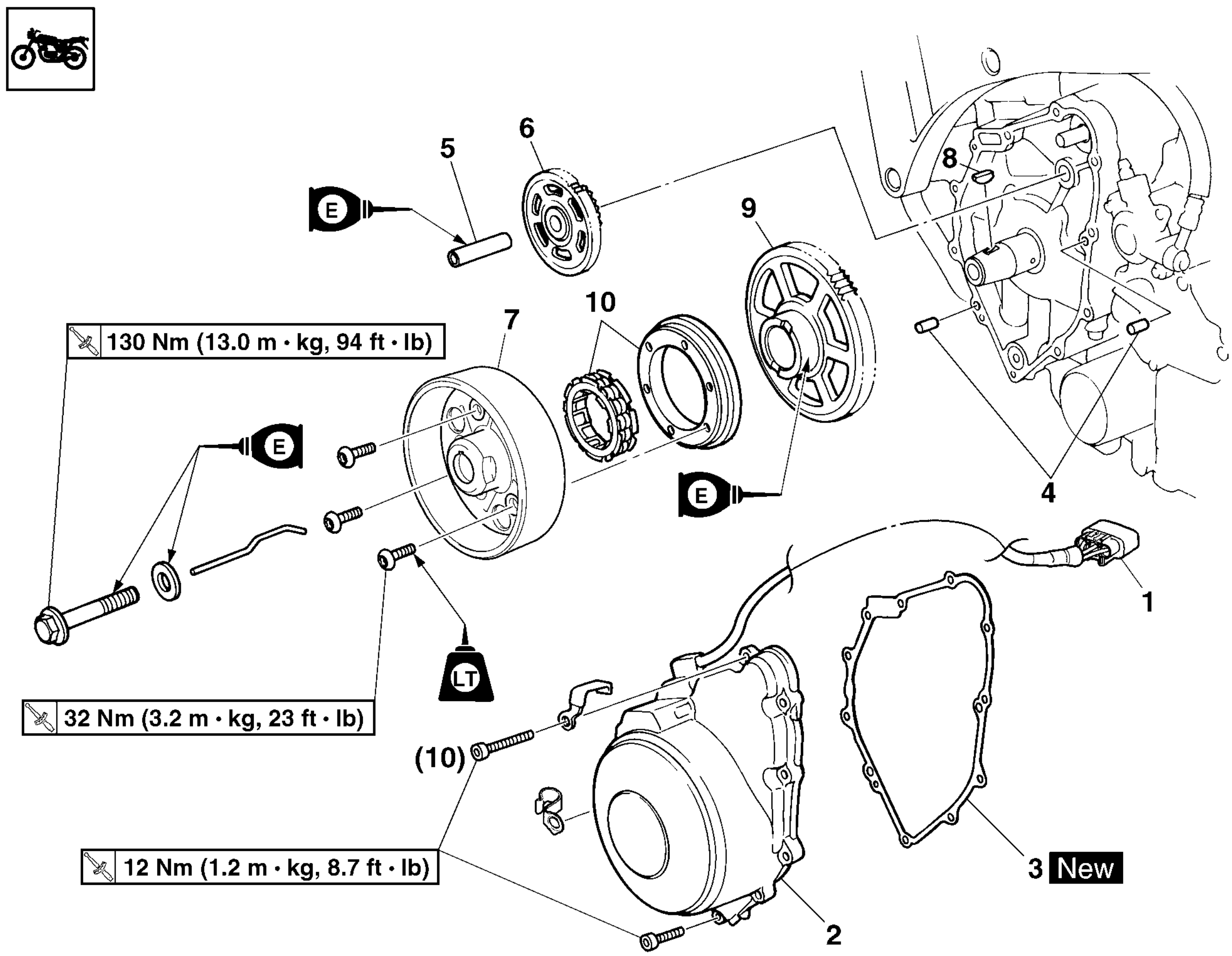
EAS24480
GENERATOR AND STARTER CLUTCH

Removing the generator rotor and starter clutch



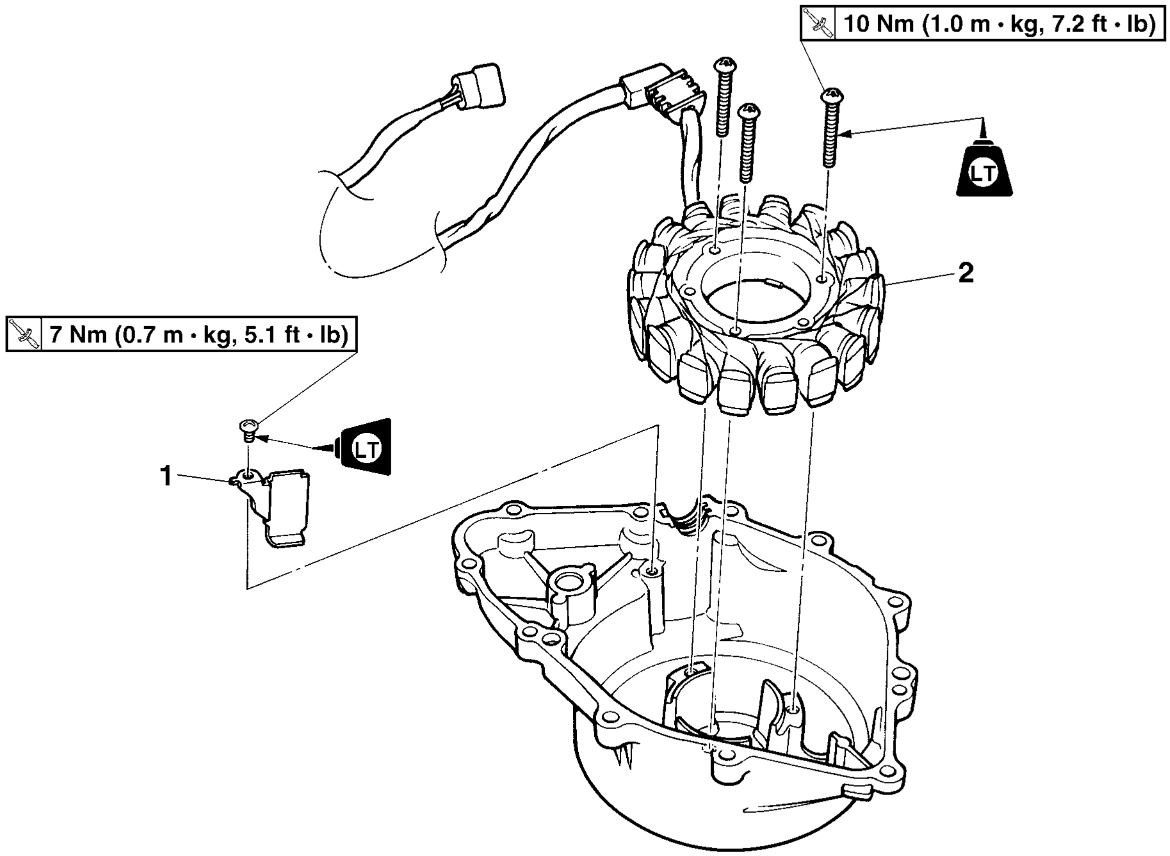
Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-15.
1	Stator coil coupler	1	Disconnect.
2	Generator cover	1	
3	Generator cover gasket	1	
4	Dowel pin	2	
5	Starter clutch idle gear shaft	1	
6	Starter clutch idle gear	1	
7	Generator rotor	1	
8	Woodruff key	1	
9	Starter clutch gear	1	

Removing the generator rotor and starter clutch



Order	Job/Parts to remove	Q'ty	Remarks
10	Starter clutch	1	
			For installation, reverse the removal procedure.

Removing the stator coil assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	Stator coil assembly lead holder	1	
2	Stator coil assembly	1	
			For installation, reverse the removal procedure.

EAS24490

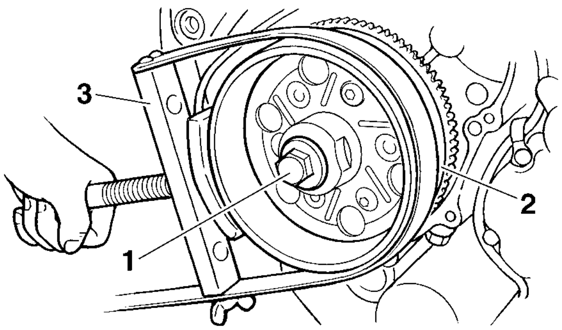
REMOVING THE GENERATOR

1. Remove:
   - Generator rotor bolt “1”
   - Washer

TIP

While holding the generator rotor “2” with the sheave holder “3”, loosen the generator rotor bolt.

Sheave holder
90890-01701
Primary clutch holder
YS-01880-A



2. Remove:
   - Generator rotor “1” (with the flywheel puller “2”)
   - Woodruff key

ECA13880

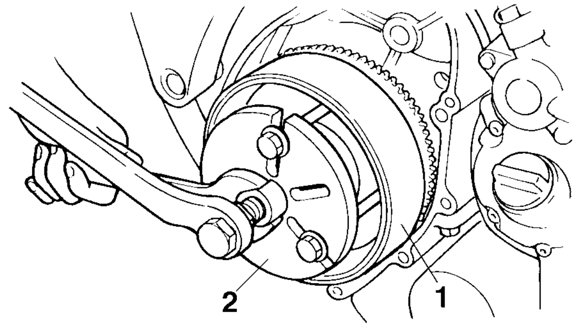
NOTICE

To protect the end of the crankshaft, place an appropriate sized socket between the fly-wheel puller set’s center bolt and the crank-shaft.

TIP

Make sure the flywheel puller is centered over the generator rotor.

Flywheel puller
90890-01362
Heavy duty puller
YU-33270-B



EAS24560

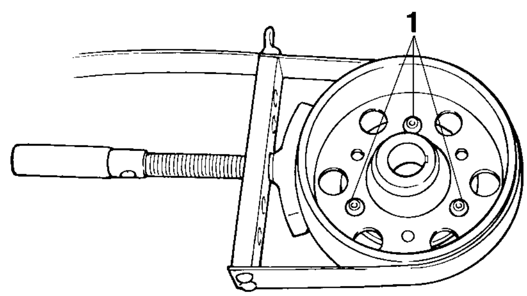
REMOVING THE STARTER CLUTCH

1. Remove:
   - Starter clutch bolts “1”

TIP

While holding the generator rotor with the sheave holder, remove the starter clutch bolts.

Sheave holder
90890-01701
Primary clutch holder
YS-01880-A



EAS24570

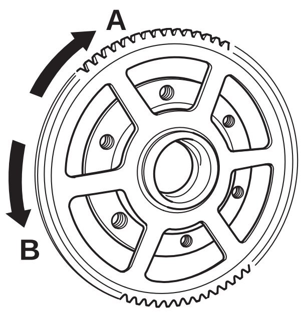
CHECKING THE STARTER CLUTCH

1. Check:
   - Starter clutch rollers
     Damage/wear → Replace.
2. Check:
   - Starter clutch idle gear
   - Starter clutch gear
     Burrs/chips/roughness/wear → Replace the defective part(s).
3. Check:
   - Starter clutch gear’s contacting surfaces
     Damage/pitting/wear → Replace the starter clutch gear.
4. Check:
   - Starter clutch operation

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a. Install the starter clutch gear onto the starter clutch and hold the starter clutch.

b. When turning the starter clutch gear clockwise "A", the starter clutch and the starter clutch gear should engage, otherwise the starter clutch is faulty and must be replaced.
c. When turning the starter clutch gear counterclockwise "B", it should turn freely, otherwise the starter clutch is faulty and must be replaced.



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EAS24600
INSTALLING THE STARTER CLUTCH

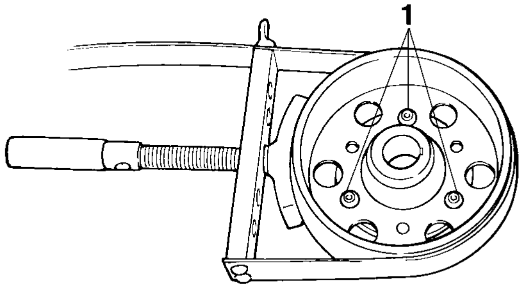
1. Install:
   - Starter clutch
   - Starter clutch bolts "1"

Starter clutch bolt **32 Nm (3.2 m·kg, 23 ft·lb)** **LOCTITE®**

TIP

While holding the generator rotor with the sheave holder, tighten the starter clutch bolts.

Sheave holder **90890-01701** **Primary clutch holder** **YS-01880-A**



EAS24500
INSTALLING THE GENERATOR

1. Install:
   - Woodruff key
   - Generator rotor
   - Washer
   - Generator rotor bolt

TIP

- Clean the tapered portion of the crankshaft and the generator rotor hub.
- When installing the generator rotor, make sure the woodruff key is properly seated in the keyway of the crankshaft.
- Lubricate the generator rotor bolt threads and washer mating surfaces with engine oil.

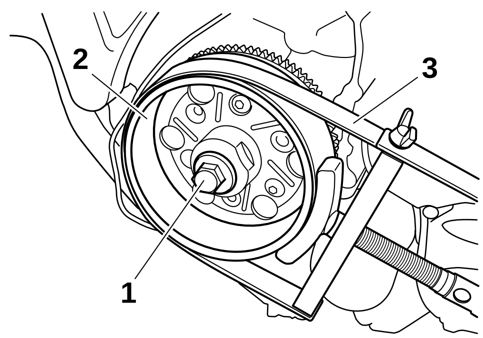
2. Tighten:
   - Generator rotor bolt "1"

Generator rotor bolt **130 Nm (13.0 m·kg, 94 ft·lb)**

TIP

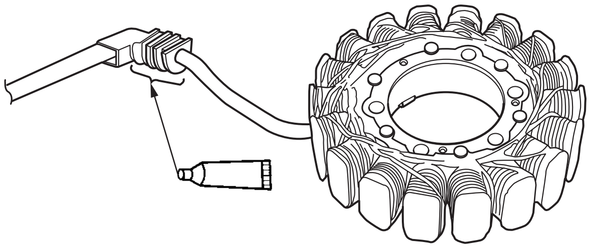
While holding the generator rotor "2" with the sheave holder "3", tighten the generator rotor bolt.

Sheave holder **90890-01701** **Primary clutch holder** **YS-01880-A**

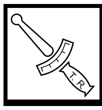


3. Apply:
   - Sealant
     (onto the stator coil assembly lead grommet)

Yamaha bond No. 1215 **90890-85505** **(Three Bond No.1215®)**



4. Install:
   - Generator cover gasket New
   - Generator cover

	**Generator cover bolt** **12 Nm (1.2 m·kg, 8.7 ft·lb)**

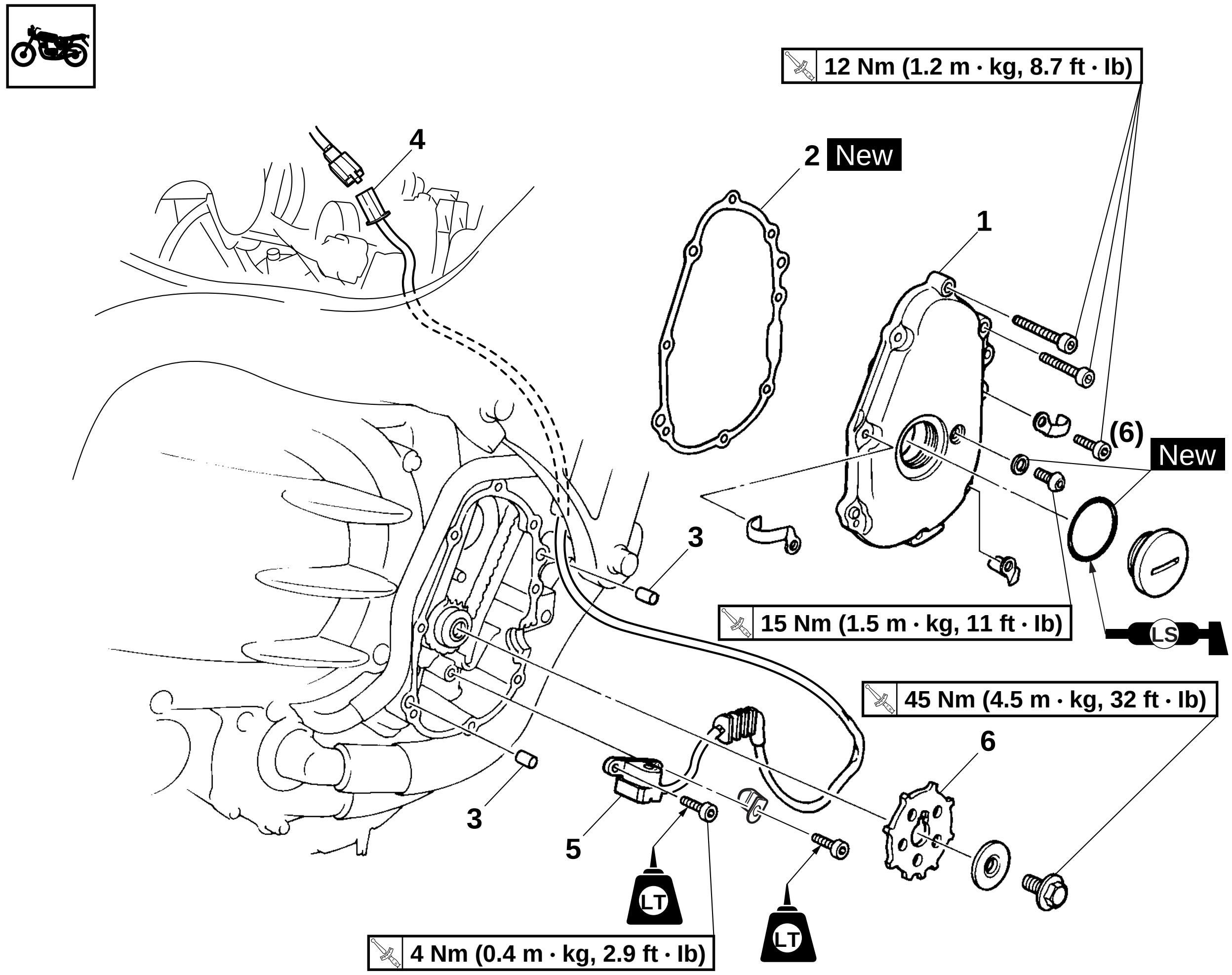
TIP

Tighten the generator cover bolts in stages and in a crisscross pattern.

EAS24520

PICKUP ROTOR

Removing the pickup rotor



Order	Job/Parts to remove	Q'ty	Remarks
	Side cowlings/Air filter case		Refer to “GENERAL CHASSIS” on page 4-1.
	Fuel tank		Refer to “FUEL TANK” on page 7-1.
	Generator cover		Refer to “GENERATOR AND STARTER CLUTCH” on page 5-33.
1	Pickup rotor cover	1	
2	Pickup rotor cover gasket	1	
3	Dowel pin	2	
4	Crankshaft position sensor coupler	1	Disconnect.
5	Crankshaft position sensor	1	
6	Pickup rotor	1	
			For installation, reverse the removal procedure.

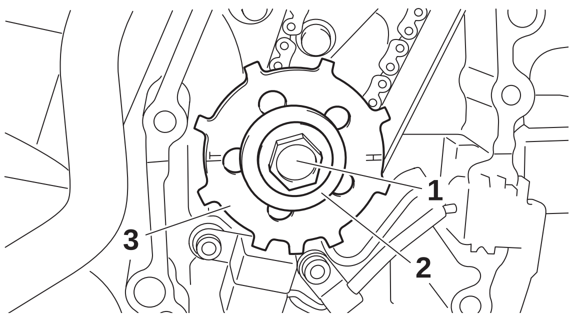
EAS24530
REMOVING THE PICKUP ROTOR

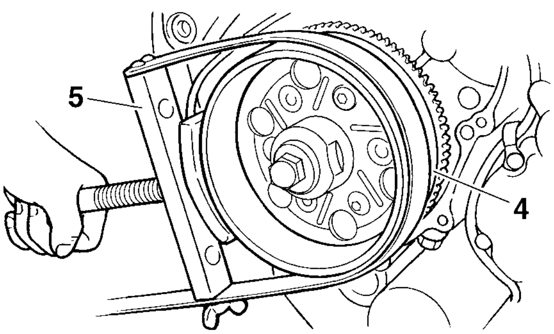
1. Remove:
   - Pickup rotor bolt “1”
   - Washer “2”
   - Pickup rotor “3”

TIP

While holding the generator rotor “4” with the sheave holder “5”, loosen the pickup rotor bolt.

Sheave holder
90890-01701
Primary clutch holder
YS-01880-A



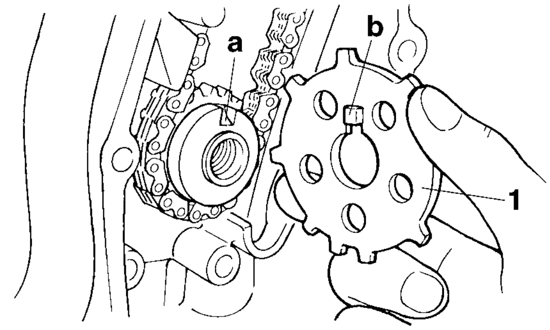


EAS24540
INSTALLING THE PICKUP ROTOR

1. Install:
   - Pickup rotor “1”
   - Washer
   - Pickup rotor bolt

TIP

When installing the pickup rotor, align the groove “a” in the crankshaft sprocket with the projection “b” in the pickup rotor.



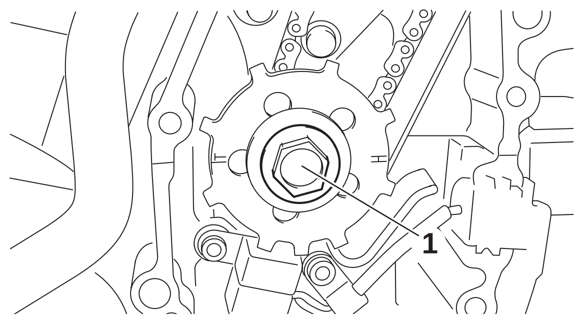
2. Tighten:
   - Pickup rotor bolt “1”

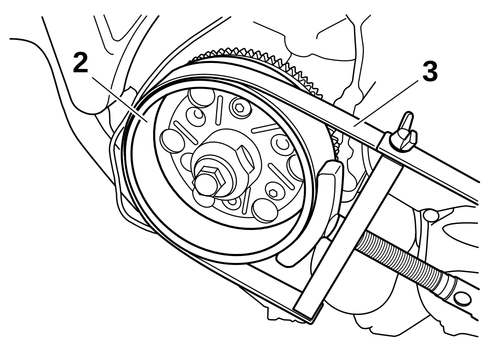
Pickup rotor bolt
45 Nm (4.5 m·kg, 32 ft·lb)

TIP

While holding the generator rotor “2” with the sheave holder “3”, tighten the pickup rotor bolt.

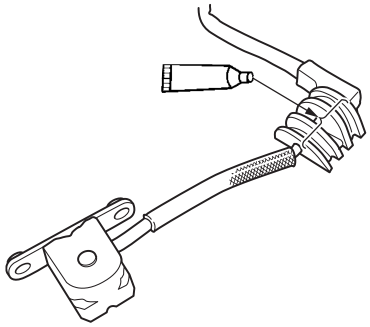
Sheave holder
90890-01701
Primary clutch holder
YS-01880-A



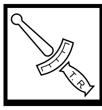


3. Apply:
   - Sealant
     (onto the crankshaft position sensor lead grommet)

Yamaha bond No. 1215
90890-85505
(Three Bond No.1215®)



4. Install:
   - Pickup rotor cover gasket **New**
   - Pickup rotor cover

	**Pickup rotor cover bolt** **12 Nm (1.2 m·kg, 8.7 ft·lb)**

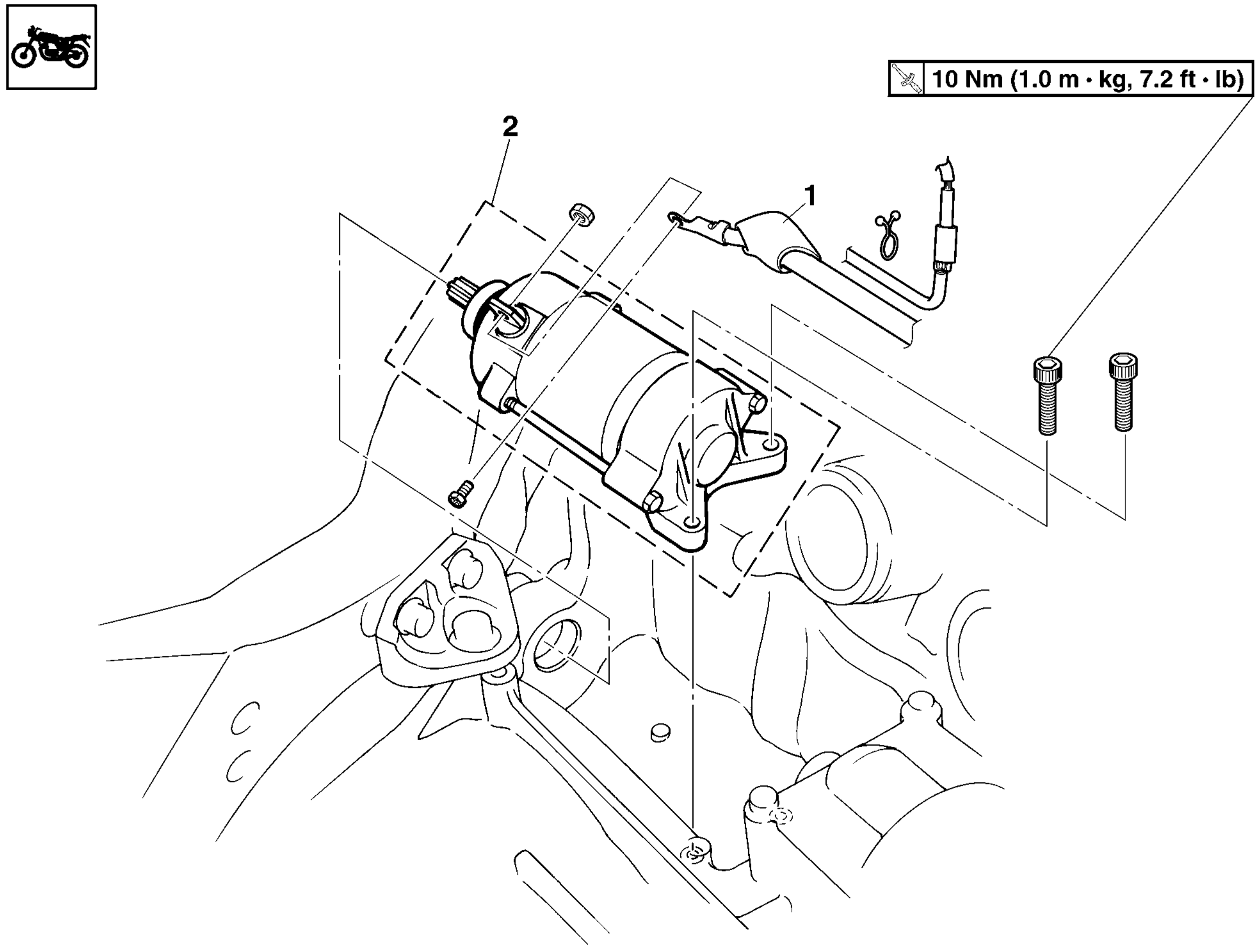
TIP

Tighten the pickup rotor cover bolts in stages and in a crisscross pattern.

EAS24780

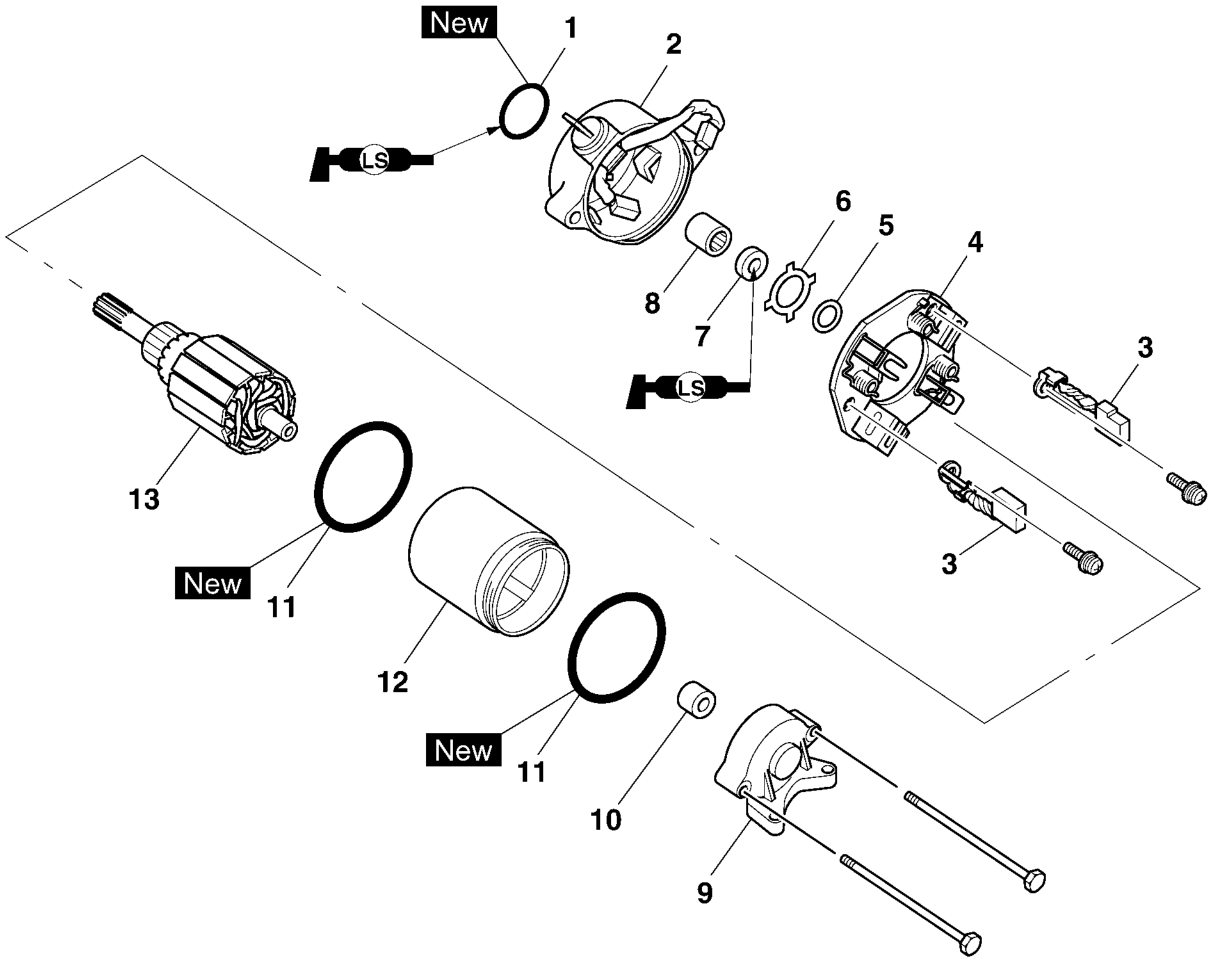
ELECTRIC STARTER

Removing the starter motor



Order	Job/Parts to remove	Q'ty	Remarks
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-5.
1	Starter motor lead	1	Disconnect.
2	Starter motor assembly	1	
			For installation, reverse the removal procedure.

Disassembling the starter motor



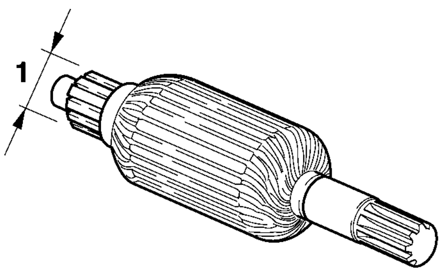
Order	Job/Parts to remove	Q'ty	Remarks
1	O-ring	1	
2	Starter motor front cover	1	
3	Brush	2	
4	Brush seat (along with brushes)	1	
5	Washer	1	
6	Lock washer	1	
7	Oil seal	1	
8	Bearing	1	
9	Starter motor rear cover	1	
10	Collar	1	
11	O-ring	2	
12	Starter motor yoke	1	
13	Armature assembly	1	
			For assembly, reverse the disassembly procedure.

EAS24790

CHECKING THE STARTER MOTOR

1. Check:
   - Commutator
     Dirt → Clean with 600 grit sandpaper.
2. Measure:
   - Commutator diameter "1"
     Out of specification → Replace the starter motor.

Limit
23.5 mm (0.93 in)



3. Measure:
   - Mica undercut "a"
     Out of specification → Scrape the mica to the proper measurement with a hacksaw blade that has been grounded to fit the commutator.

Mica undercut (depth)
1.50 mm (0.06 in)

TIP

The mica of the commutator must be undercut to ensure proper operation of the commutator.



4. Measure:
   - Armature assembly resistances (commutator and insulation)
     Out of specification → Replace the starter motor.

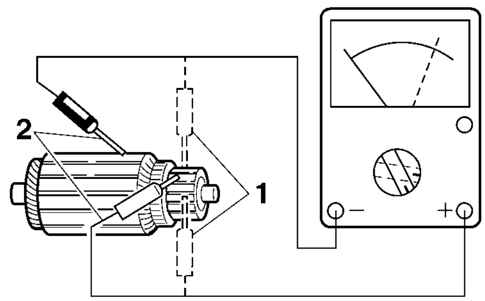
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a. Measure the armature assembly resistances with the pocket tester.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

Armature coil
Commutator resistance "1"
0.024–0.030 Ω at 20 °C (68 °F)
Insulation resistance "2"
Above 1 MΩ at 20 °C (68 °F)

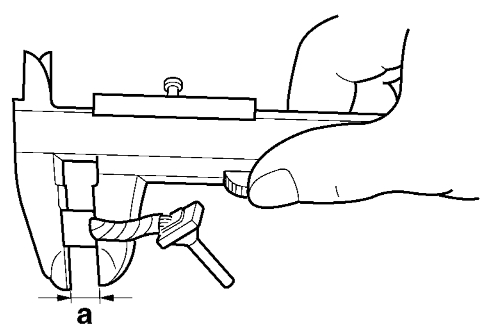
b. If any resistance is out of specification, replace the starter motor.



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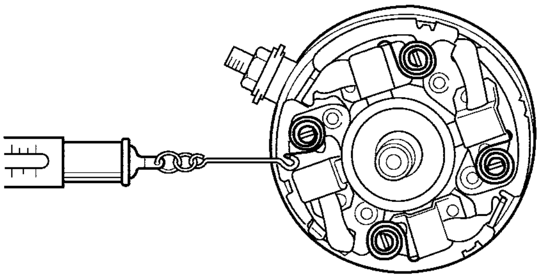
5. Measure:
   - Brush length "a"
     Out of specification → Replace the brushes as a set.

Limit
3.65 mm (0.14 in)



6. Measure:
   - Brush spring force
     Out of specification → Replace the brush springs as a set.

Brush spring force
5.28–7.92 N (19.01–28.51 oz)
(538–808 gf)



7. Check:
   - Gear teeth
     Damage/wear → Replace the gear.
8. Check:
   - Bearing
   - Oil seal
     Damage/wear → Replace the defective part(s).

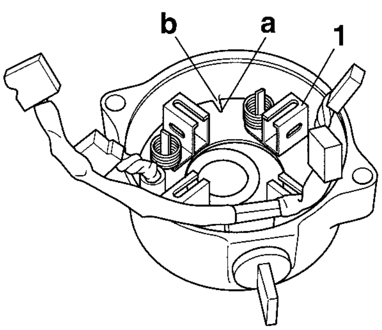
EAS24800

ASSEMBLING THE STARTER MOTOR

1. Install:
   - Brush seat “1”

TIP

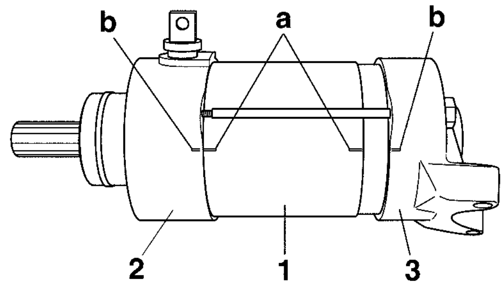
Align the slot “a” on the brush seat with the tab “b” in the starter motor front cover.



2. Install:
   - Starter motor yoke “1”
   - Starter motor front cover “2”
   - Starter motor rear cover “3”

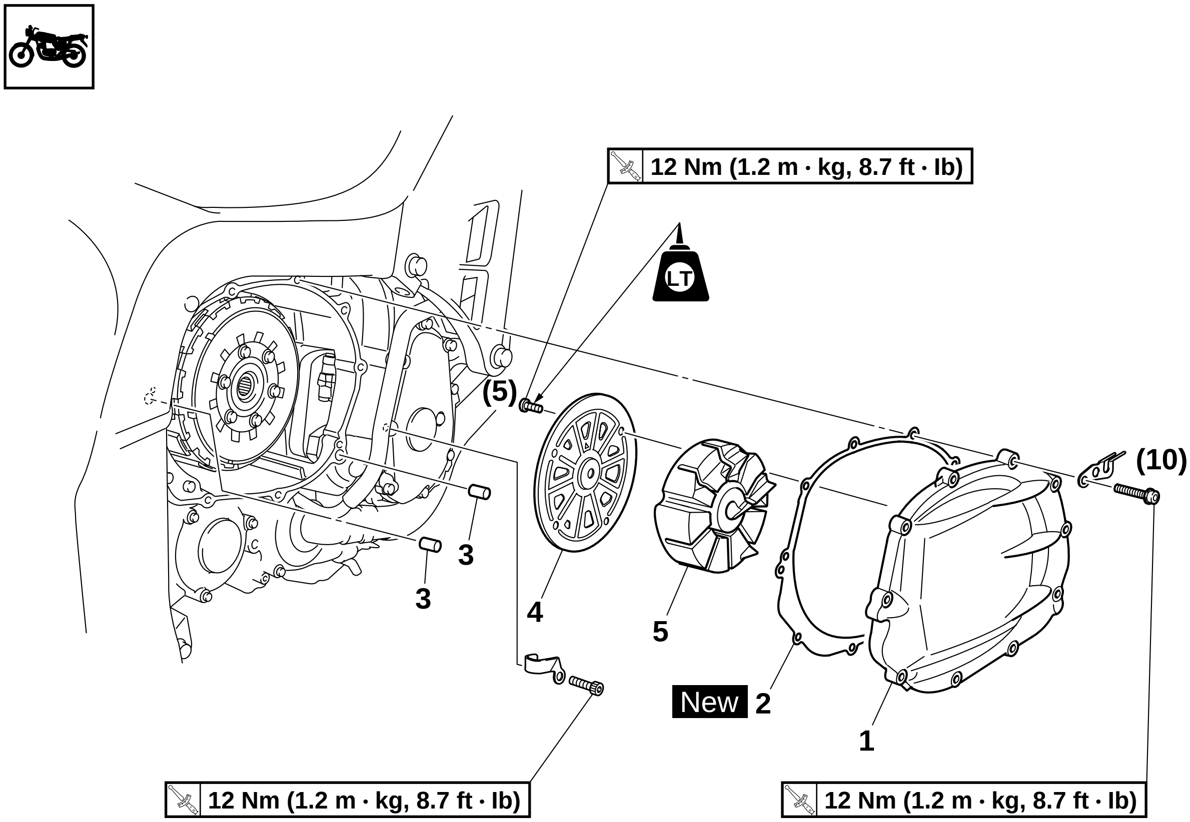
TIP

Align the match marks “a” on the starter motor yoke with the match marks “b” on the starter motor front and rear covers.



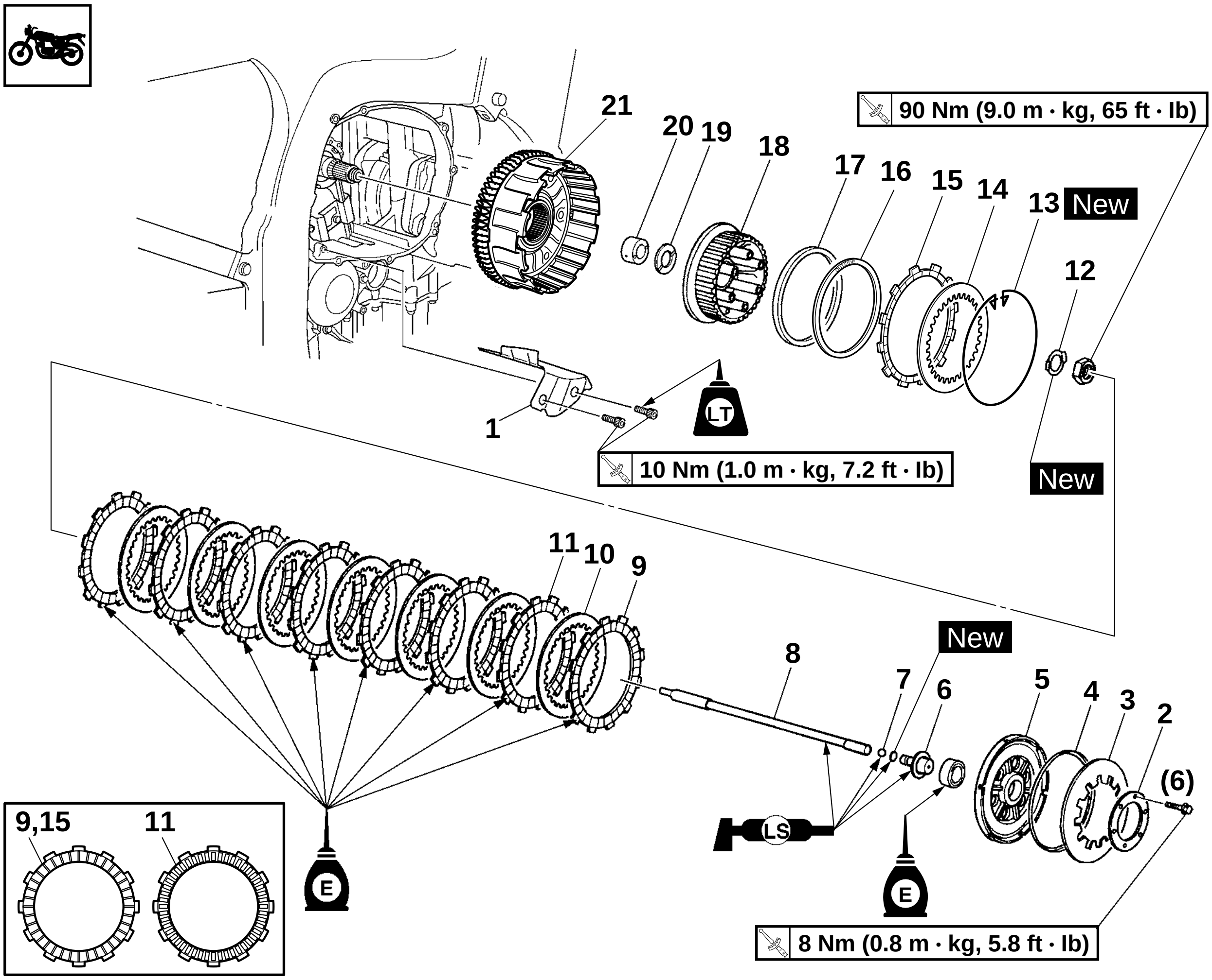
EAS25060
CLUTCH

Removing the clutch cover



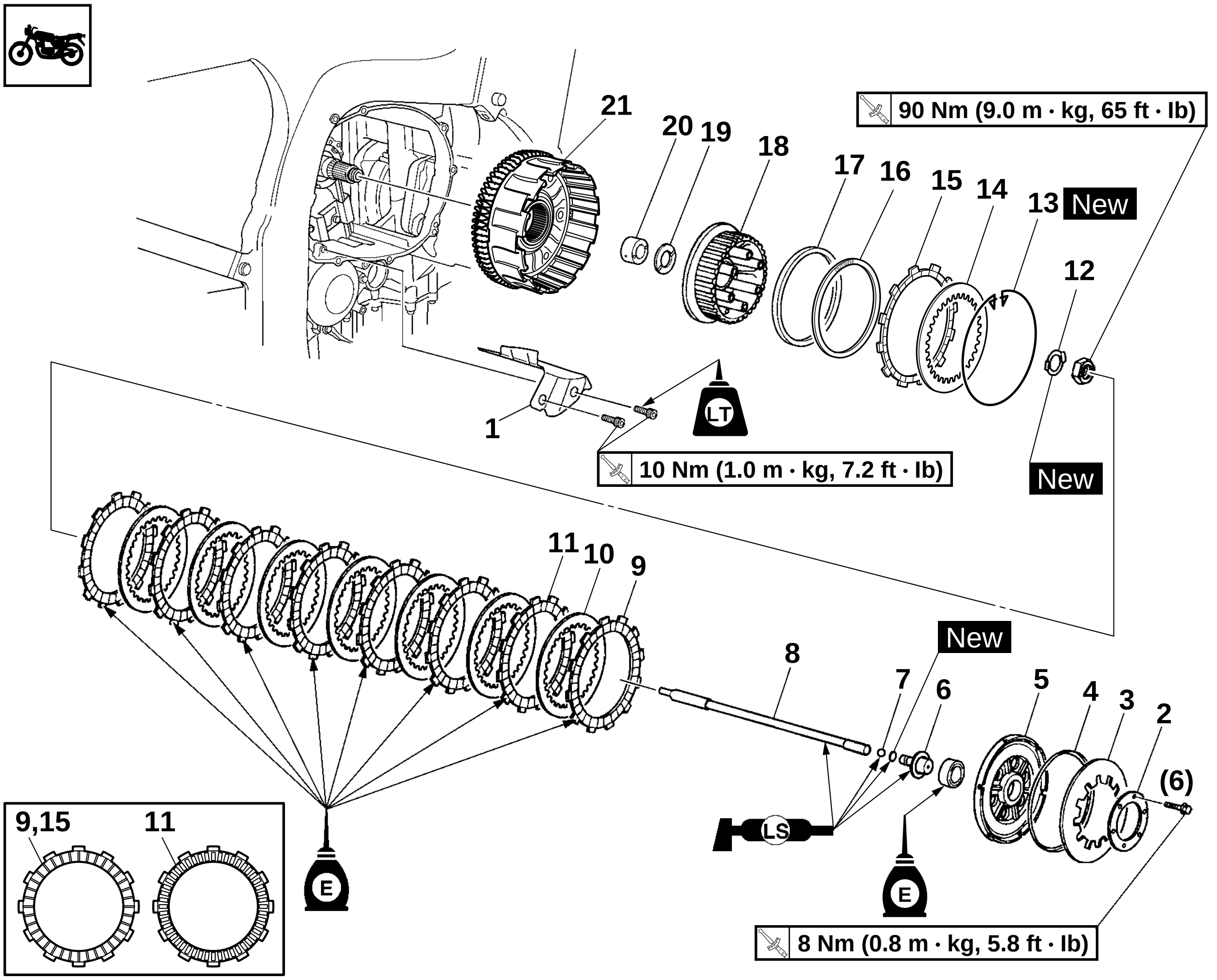
Order	Job/Parts to remove	Q'ty	Remarks
	Right side cowling		Refer to "GENERAL CHASSIS" on page 4-1.
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-15.
1	Clutch cover	1	
2	Clutch cover gasket	1	
3	Dowel pin	2	
4	Damper cover	1	
5	Damper	1	
			For installation, reverse the removal procedure.

Removing the clutch (FJR13A)



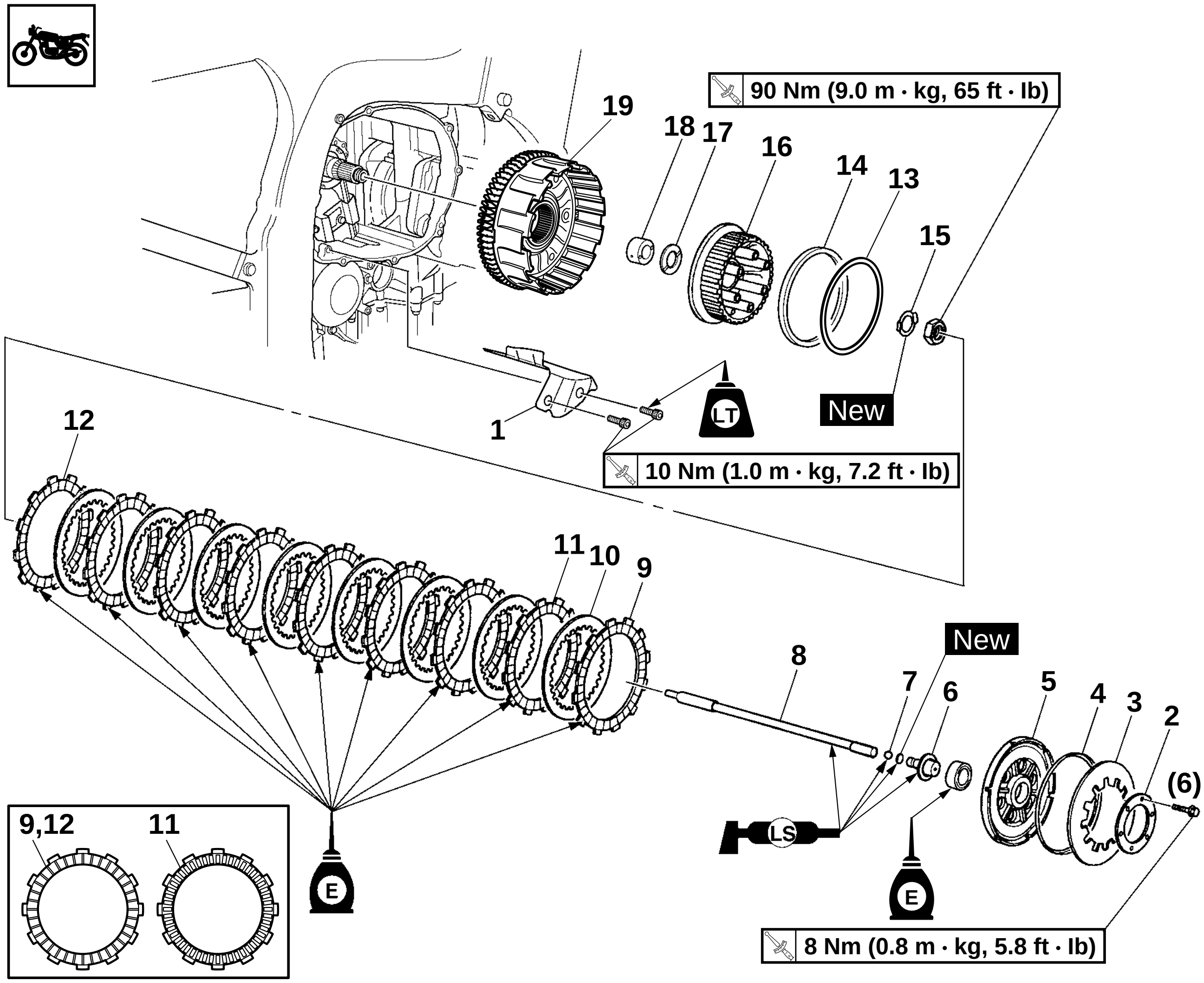
Order	Job/Parts to remove	Q'ty	Remarks
	Rear balancer		Refer to "BALANCERS" on page 5-136.
1	Oil guide plate	1	
2	Clutch spring plate retainer	1	
3	Clutch spring plate	1	
4	Clutch spring plate seat	1	
5	Pressure plate	1	
6	Short clutch push rod	1	
7	Ball	1	
8	Long clutch push rod	1	
9	Friction plate 1	1	Inside diameter: 124 mm (4.88 in)
10	Clutch plate	7	
11	Friction plate 2	7	Inside diameter: 124 mm (4.88 in)
12	Lock washer	1	
13	Wire circlip	1	
14	Clutch plate	1	
15	Friction plate 3	1	Inside diameter: 135 mm (5.31 in)
16	Clutch damper spring	1	

Removing the clutch (FJR13A)



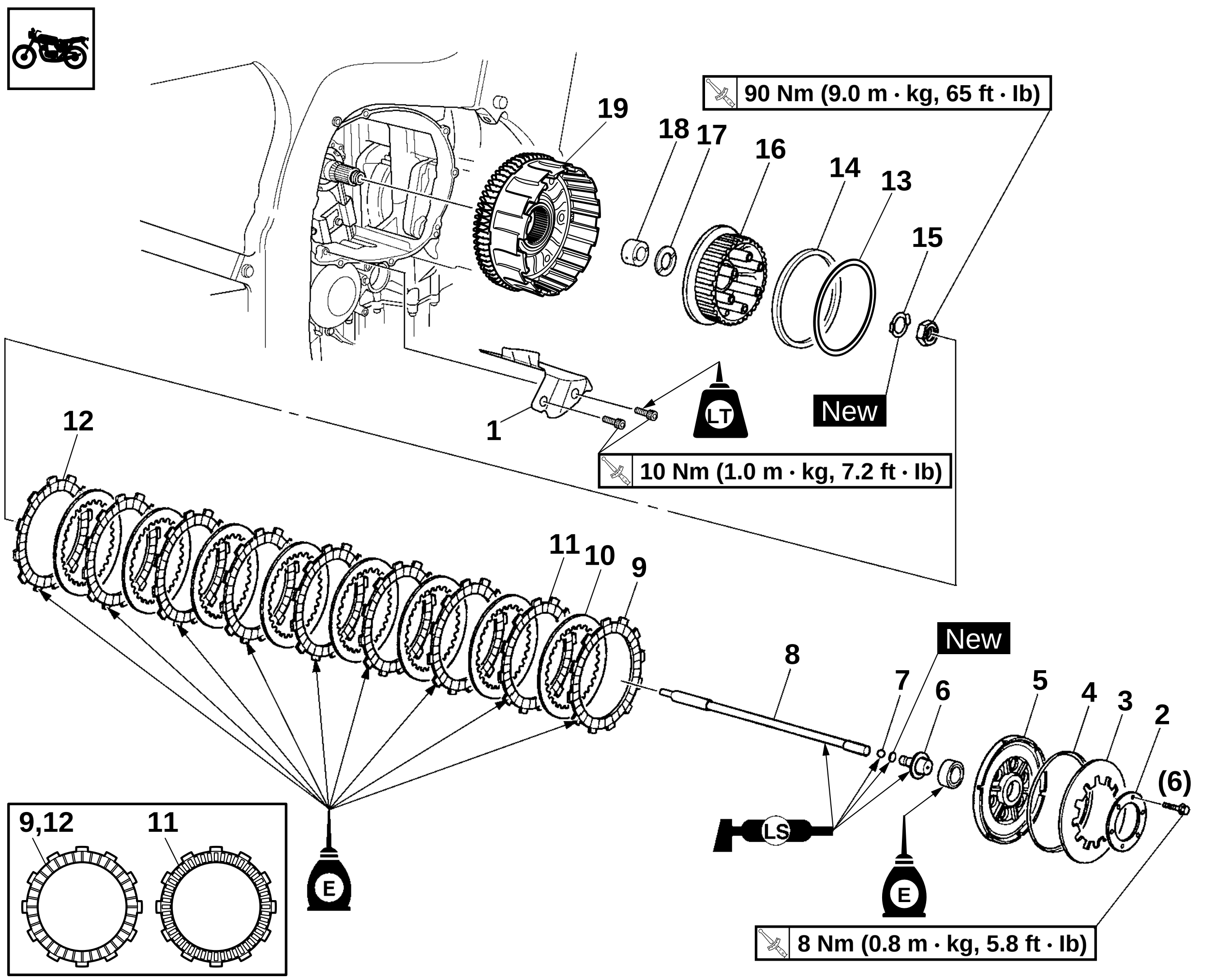
Order	Job/Parts to remove	Q'ty	Remarks
17	Clutch damper spring seat	1	
18	Clutch boss	1	
19	Thrust washer	1	
20	Spacer	1	
21	Clutch housing	1	
			For installation, reverse the removal procedure.

Removing the clutch (FJR13AE)



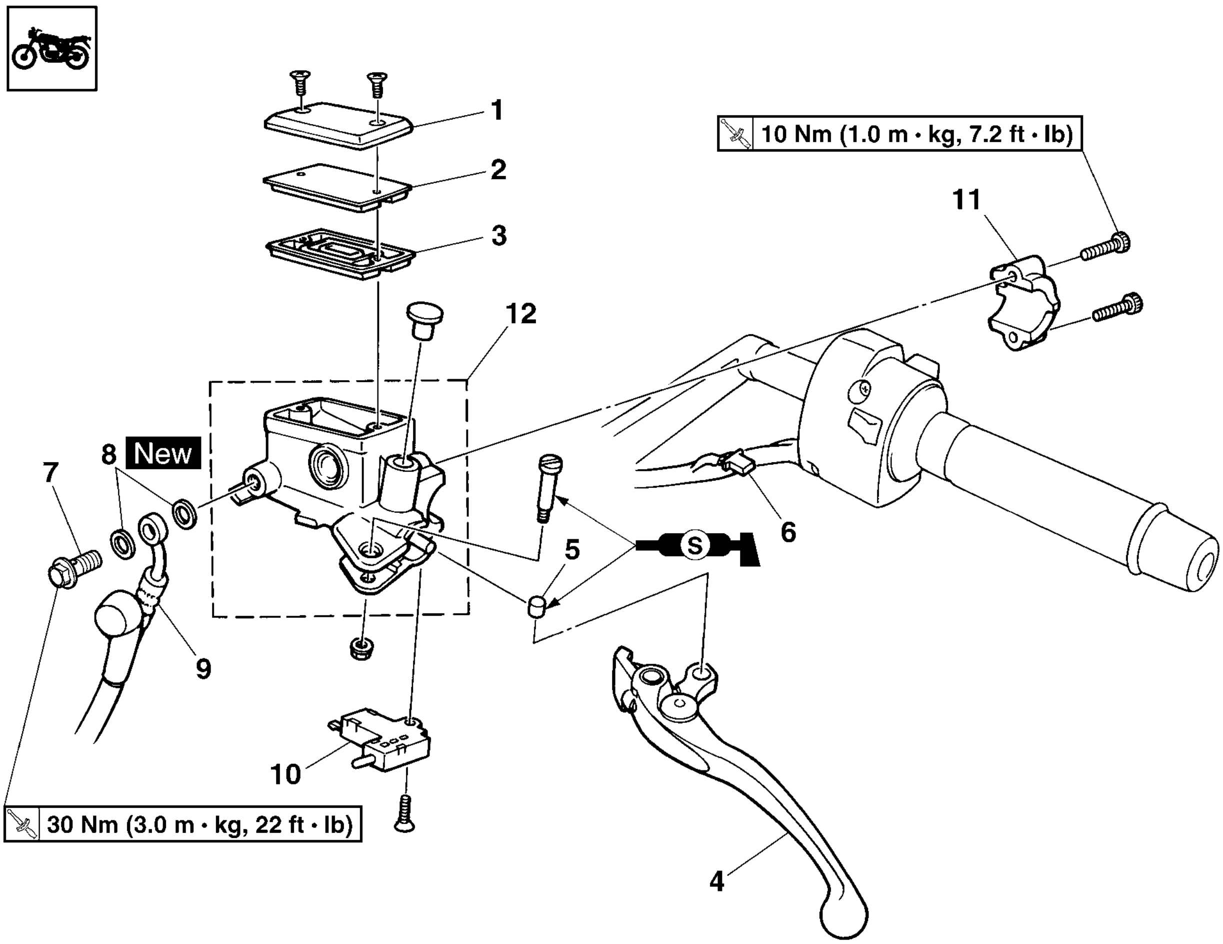
Order	Job/Parts to remove	Q'ty	Remarks
	Rear balancer		Refer to "BALANCERS" on page 5-136.
1	Oil guide plate	1	
2	Clutch spring plate retainer	1	
3	Clutch spring plate	1	
4	Clutch spring plate seat	1	
5	Pressure plate	1	
6	Short clutch push rod	1	
7	Ball	1	
8	Long clutch push rod	1	
9	Friction plate 1	1	Inside diameter: 124 mm (4.88 in)
10	Clutch plate	8	
11	Friction plate 2	7	Inside diameter: 124 mm (4.88 in)
12	Friction plate 3	1	Inside diameter: 135 mm (5.31 in)
13	Clutch damper spring	1	
14	Clutch damper spring seat	1	
15	Lock washer	1	
16	Clutch boss	1	

Removing the clutch (FJR13AE)



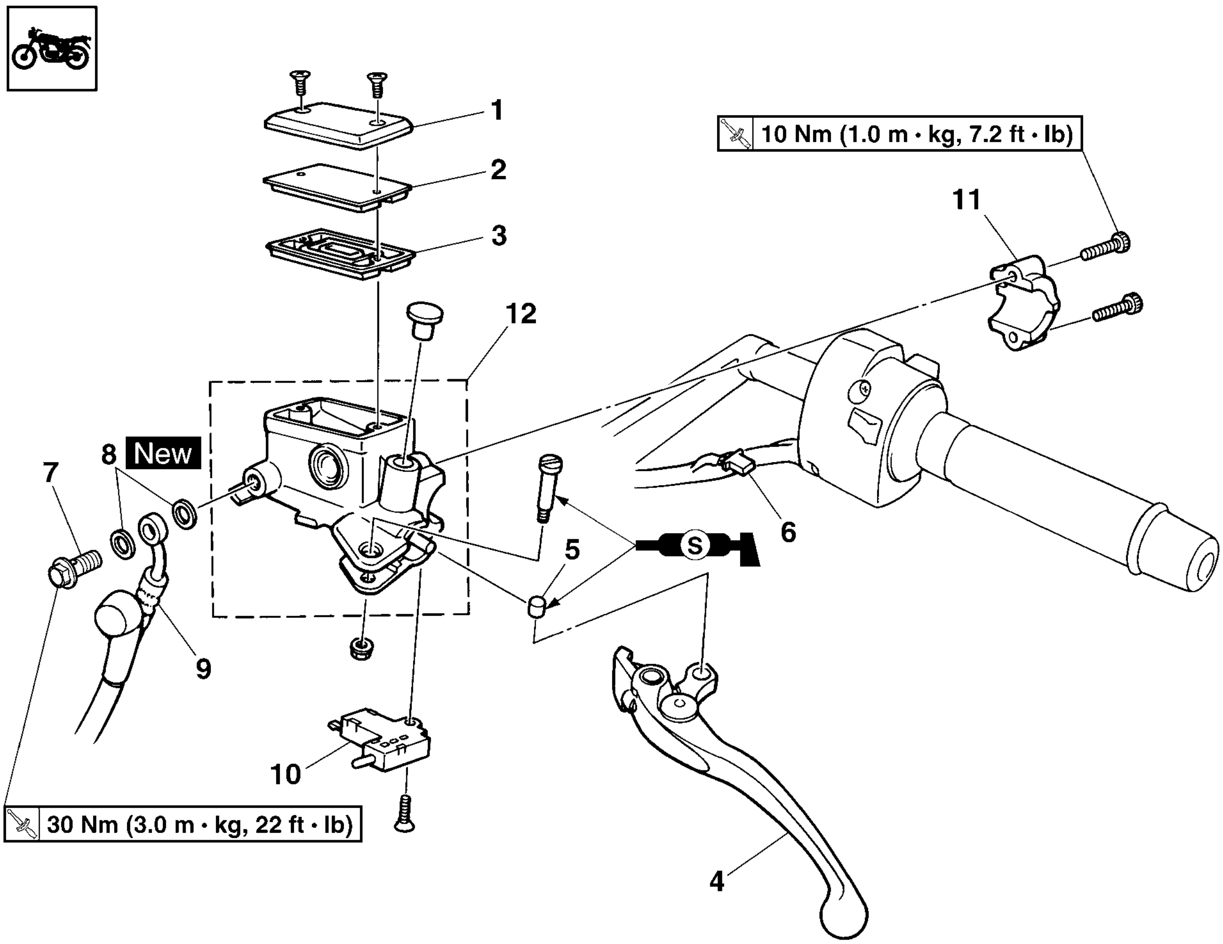
Order	Job/Parts to remove	Q'ty	Remarks
17	Thrust washer	1	
18	Spacer	1	
19	Clutch housing	1	
			For installation, reverse the removal procedure.

Removing the clutch master cylinder (FJR13A)



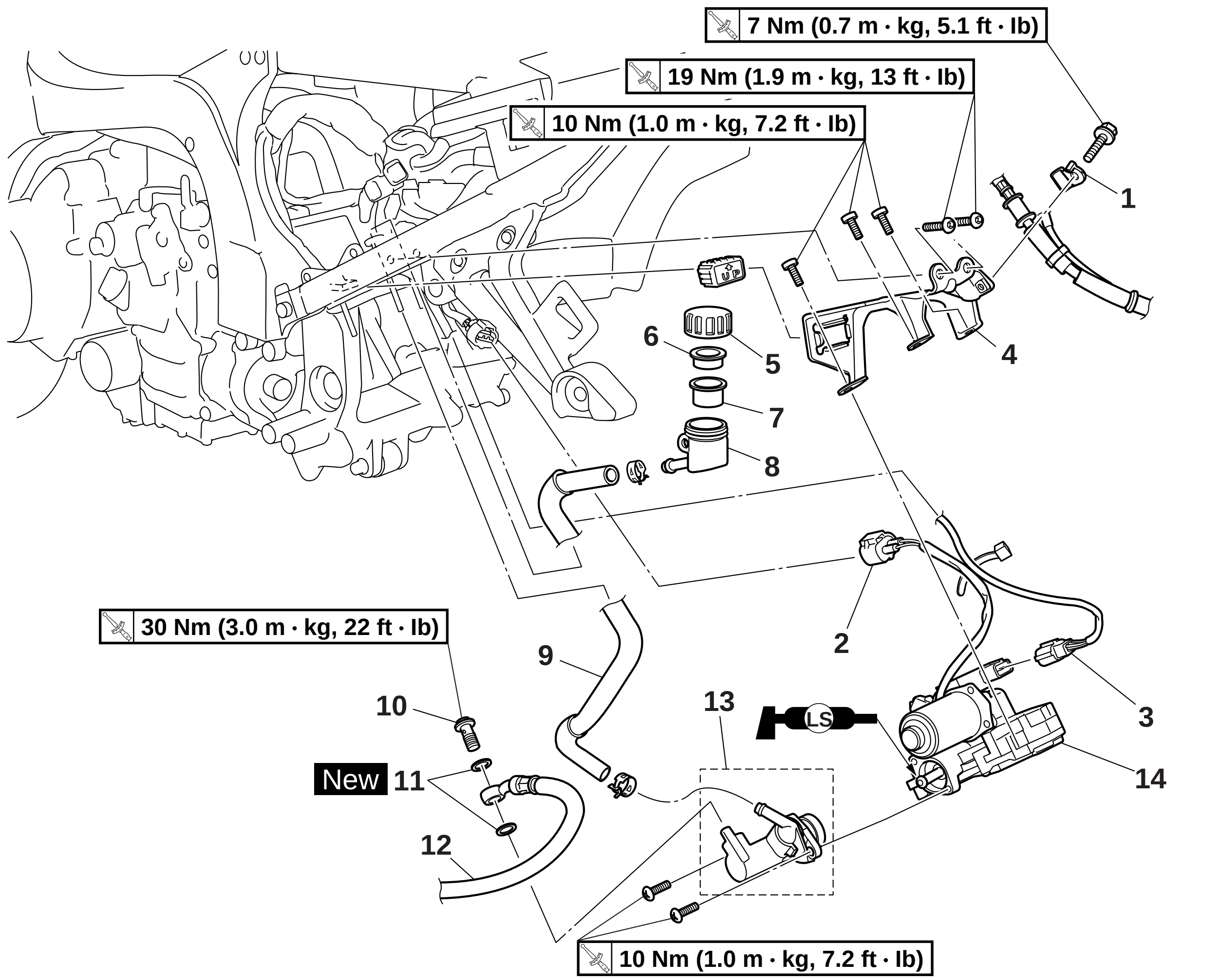
Order	Job/Parts to remove	Q'ty	Remarks
	Clutch fluid		Drain. Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13A)" on page 3-18.
1	Clutch master cylinder reservoir cap	1	
2	Clutch master cylinder reservoir diaphragm holder	1	
3	Clutch master cylinder reservoir diaphragm	1	
4	Clutch lever	1	
5	Clutch master cylinder push rod pin	1	
6	Clutch switch coupler	1	Disconnect.
7	Clutch hose union bolt	1	
8	Copper washer	2	
9	Clutch hose	1	Disconnect.
10	Clutch switch	1	
11	Clutch master cylinder holder	1	

Removing the clutch master cylinder (FJR13A)



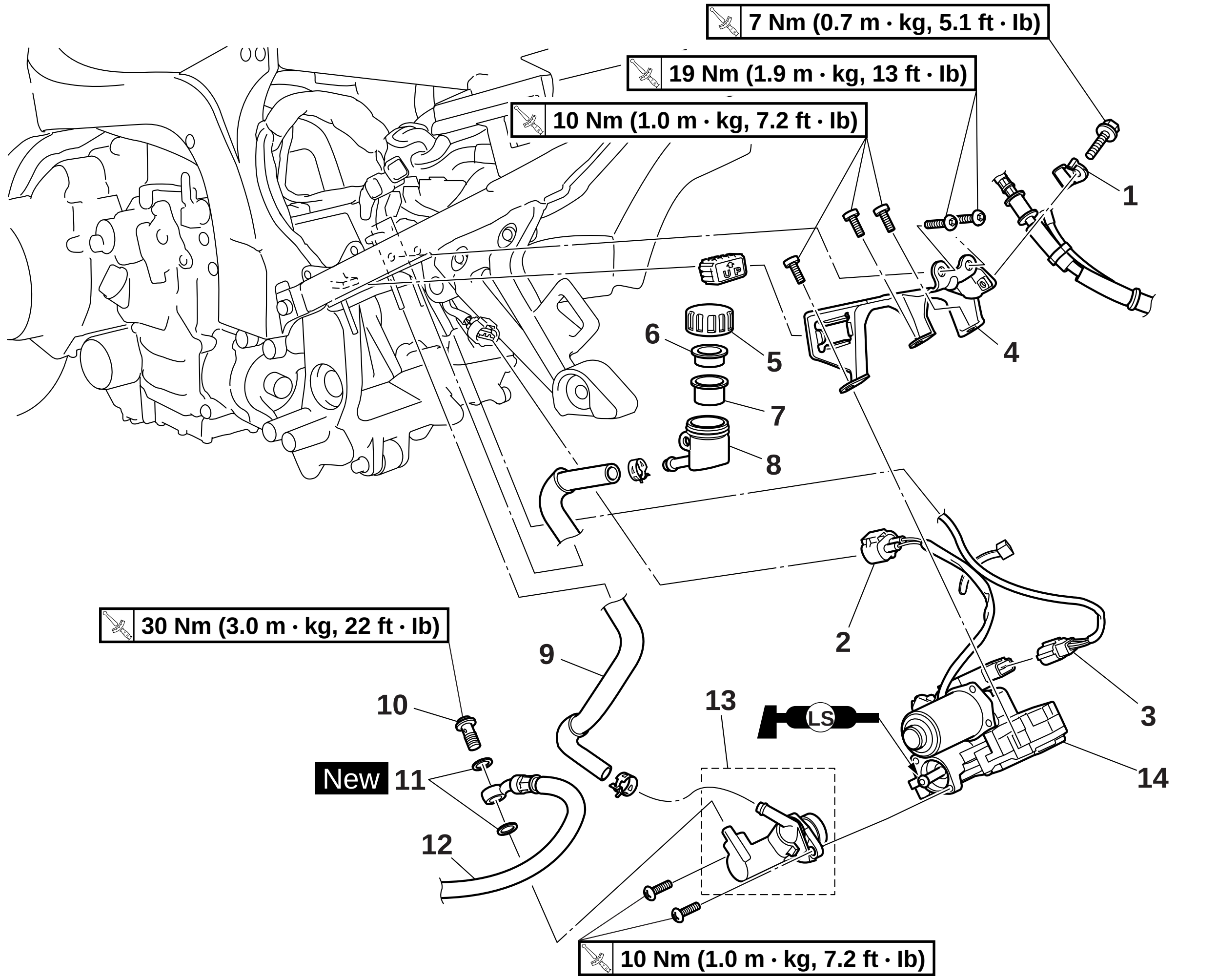
Order	Job/Parts to remove	Q'ty	Remarks
12	Clutch master cylinder	1	
			For installation, reverse the removal procedure.

Removing the clutch actuator and clutch master cylinder (FJR13AE)



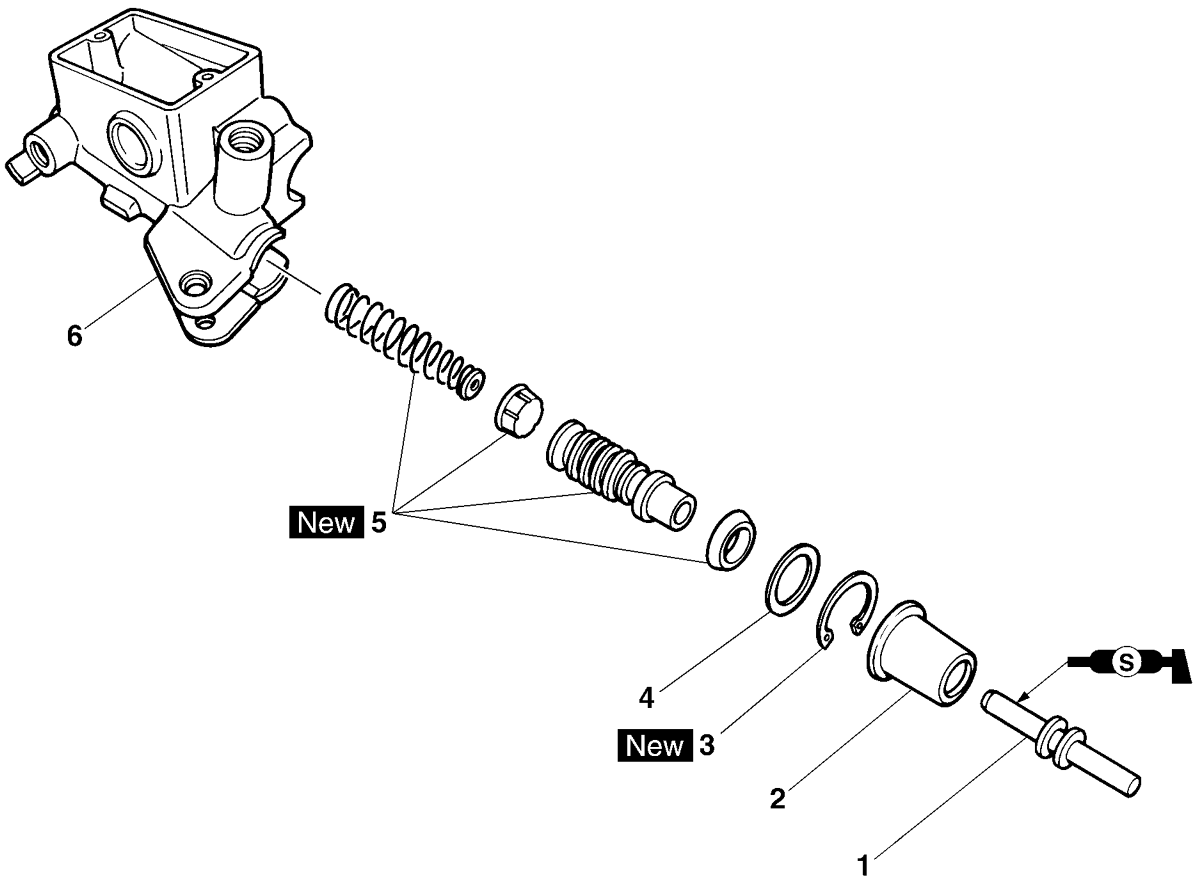
Order	Job/Parts to remove	Q'ty	Remarks
	Clutch fluid		Drain. Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)" on page 3-19.
	Swingarm		Refer to "SWINGARM" on page 4-97.
1	Rear brake hose/rear wheel sensor lead holder	1	
2	Clutch actuator motor coupler	1	Disconnect.
3	Clutch actuator sensor coupler	1	Disconnect.
4	Clutch actuator bracket	1	
5	Clutch fluid reservoir cap	1	
6	Clutch fluid reservoir diaphragm holder	1	
7	Clutch fluid reservoir diaphragm	1	
8	Clutch fluid reservoir	1	
9	Clutch fluid reservoir hose	1	
10	Clutch hose union bolt	1	
11	Copper washer	2	
12	Clutch hose	1	Disconnect.
13	Clutch master cylinder	1	

Removing the clutch actuator and clutch master cylinder (FJR13AE)



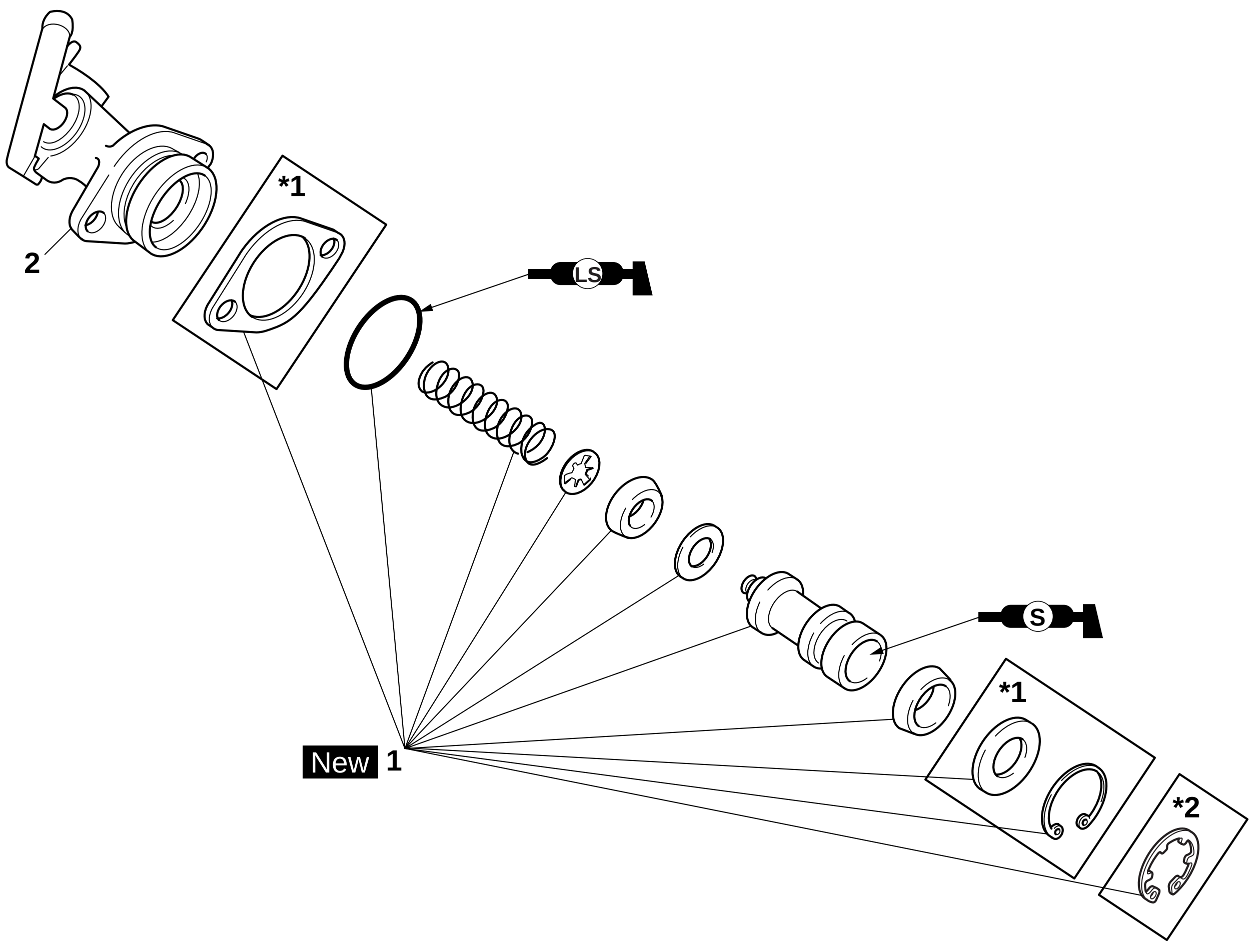
Order	Job/Parts to remove	Q'ty	Remarks
14	Clutch actuator	1	
			For installation, reverse the removal procedure.

Disassembling the clutch master cylinder (FJR13A)



Order	Job/Parts to remove	Q'ty	Remarks
1	Clutch master cylinder push rod	1	
2	Dust boot	1	
3	Circlip	1	
4	Washer	1	
5	Clutch master cylinder kit	1	
6	Clutch master cylinder body	1	
			For assembly, reverse the disassembly procedure.

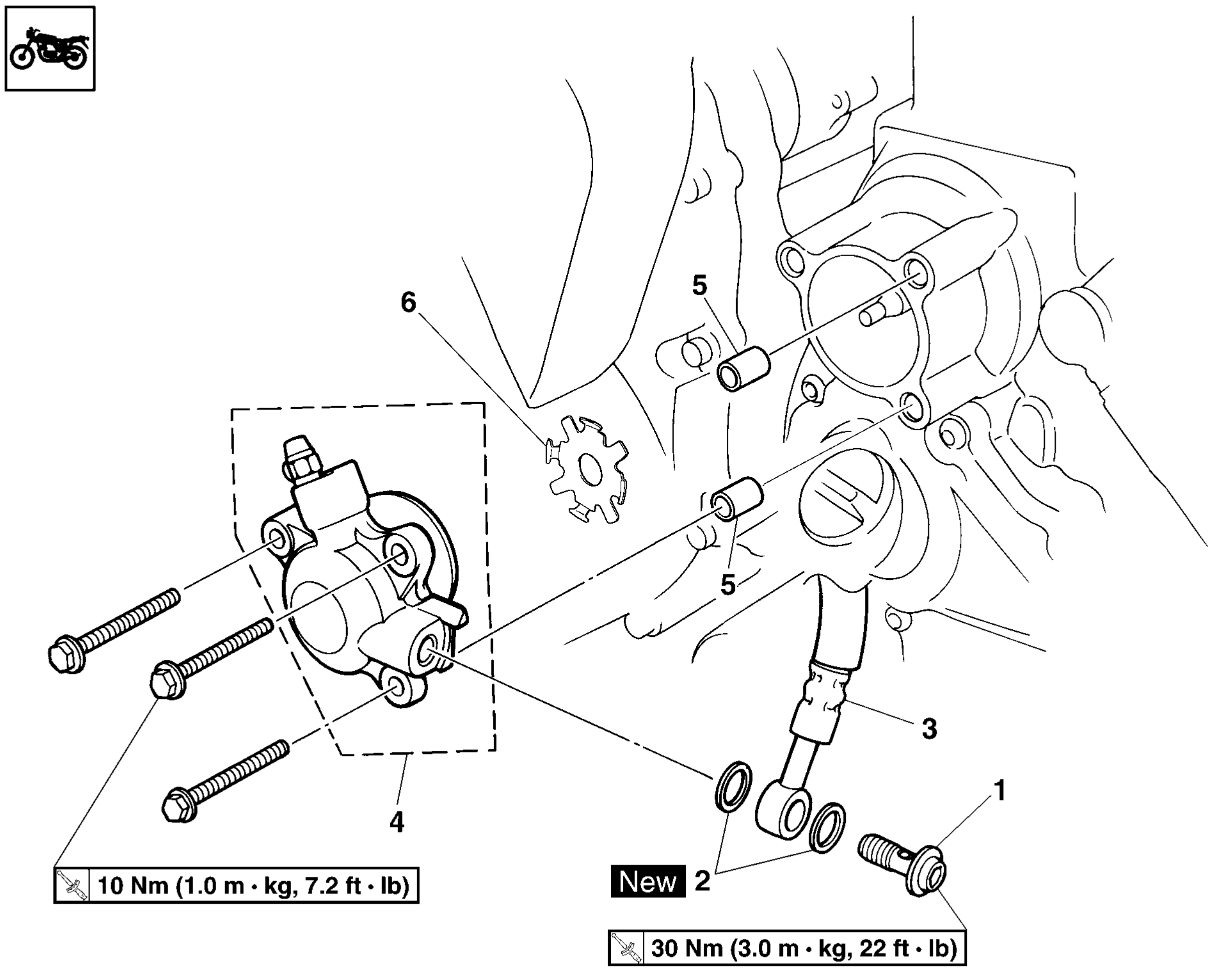
Disassembling the clutch master cylinder (FJR13AE)



Order	Job/Parts to remove	Q'ty	Remarks
1	Clutch master cylinder kit	1	
2	Clutch master cylinder body	1	
			For assembly, reverse the disassembly procedure.

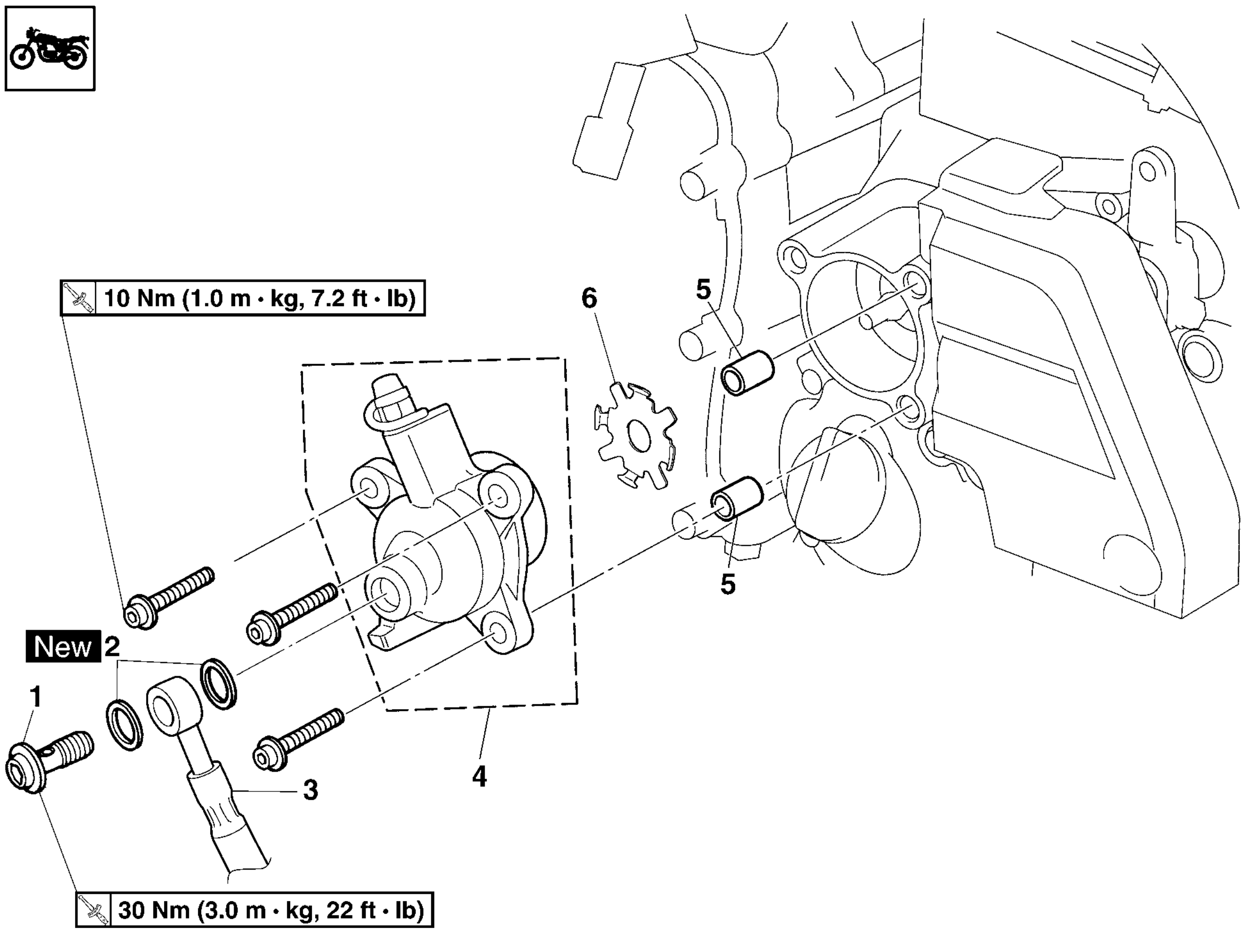
*1: These kit parts are used for all models before 2009.
*2: This kit part is used for all models after 2009.

Removing the clutch release cylinder (FJR13A)



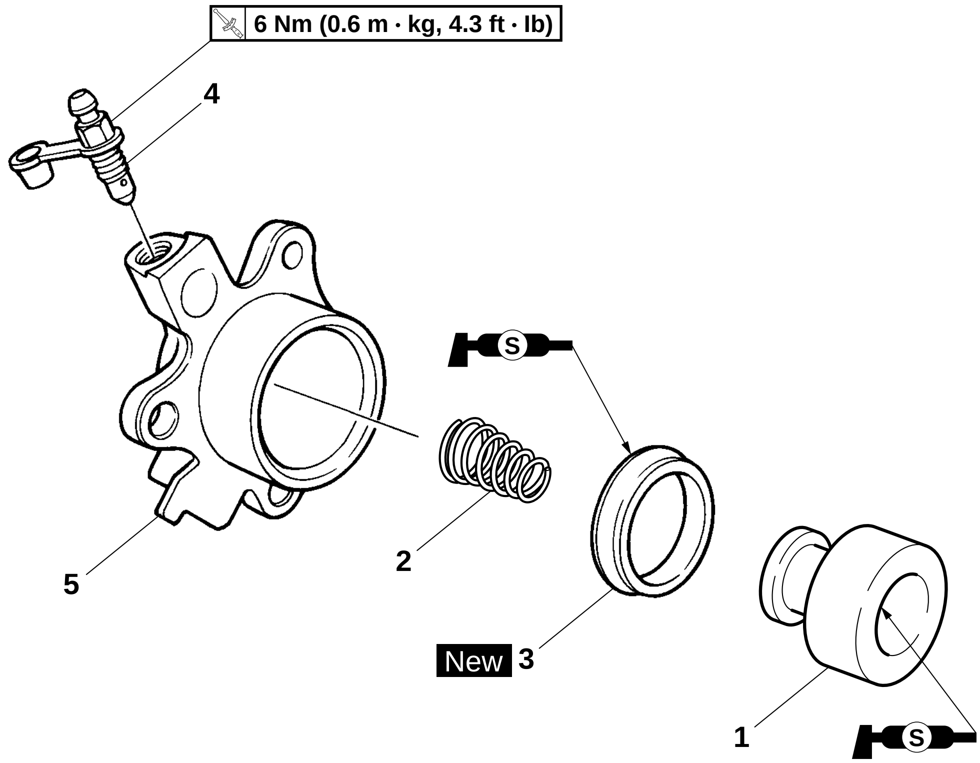
Order	Job/Parts to remove	Q'ty	Remarks
	Clutch fluid		Drain. Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13A)" on page 3-18.
1	Clutch hose union bolt	1	
2	Copper washer	2	
3	Clutch hose	1	Disconnect.
4	Clutch release cylinder	1	
5	Dowel pin	2	
6	Plate	1	
			For installation, reverse the removal procedure.

Removing the clutch release cylinder (FJR13AE)



Order	Job/Parts to remove	Q'ty	Remarks
	Clutch fluid		Drain. Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)" on page 3-19.
1	Clutch hose union bolt	1	
2	Copper washer	2	
3	Clutch hose	1	Disconnect.
4	Clutch release cylinder	1	
5	Dowel pin	2	
6	Plate	1	
			For installation, reverse the removal procedure.

Disassembling the clutch release cylinder



Order	Job/Parts to remove	Q'ty	Remarks
1	Clutch release cylinder piston	1	
2	Clutch release cylinder spring	1	
3	Clutch release cylinder piston seal	1	
4	Bleed screw	1	
5	Clutch release cylinder body	1	
			For assembly, reverse the disassembly procedure.

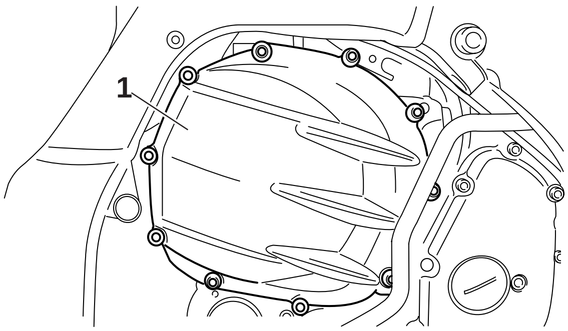
EAS25080

REMOVING THE CLUTCH (FJR13A)

1. Remove:
   - Clutch cover “1”

TIP

Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.



2. Remove:
   - Rear balancer weight
     Refer to “BALANCERS” on page 5-136.
3. Remove:
   - Clutch spring bolt

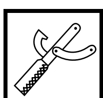
TIP

Loosen the clutch spring bolts in stages and in a crisscross pattern.

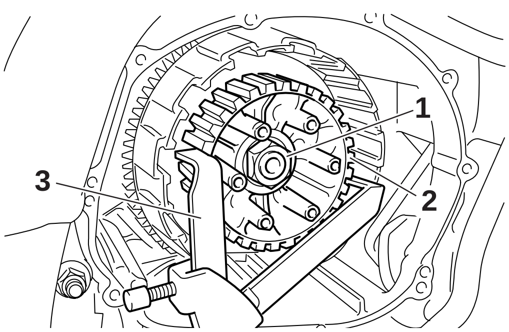
4. Straighten the lock washer tab.
5. Loosen:
   - Clutch boss nut “1”

TIP

While holding the clutch boss “2” with the universal clutch holder “3”, loosen the clutch boss nut.



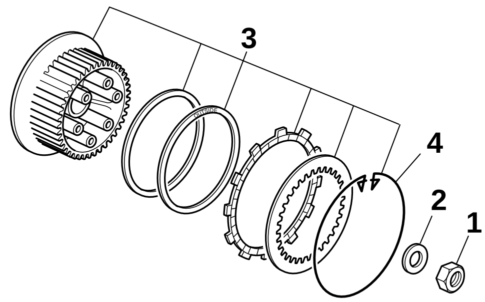
Universal clutch holder
90890-04086
YM-91042



6. Remove:
   - Clutch boss nut “1”
   - Washer “2”
   - Clutch boss assembly “3”

TIP

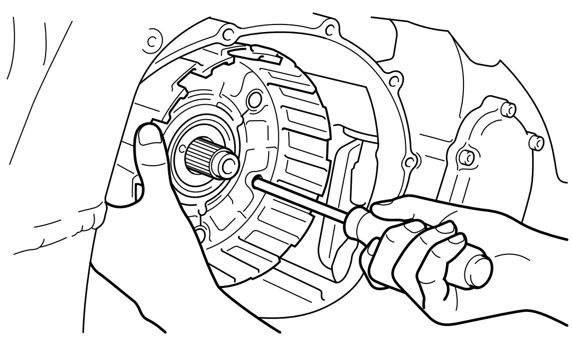
There is a built-in damper between the clutch boss and the clutch plate. It is not necessary to remove the wire circlip “4” and disassemble the built-in damper unless there is serious clutch chattering.

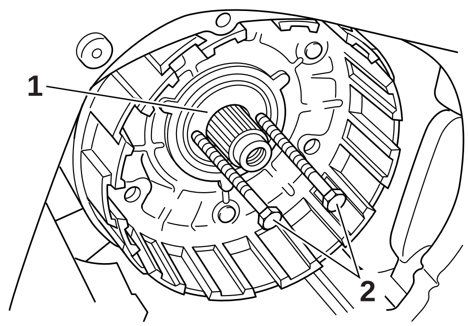


7. Remove:
   - Spacer “1”
   - Clutch housing

TIP

- Insert a cross-headed screwdriver into one of the holes of the clutch housing and primary driven gear, and then rotate the inner primary driven gear until both primary drive gears are aligned. The teeth of both primary driven gears must be aligned for installation.
- Insert two 5 mm bolts “2” into the spacer and then remove the spacer by pulling on the bolts.





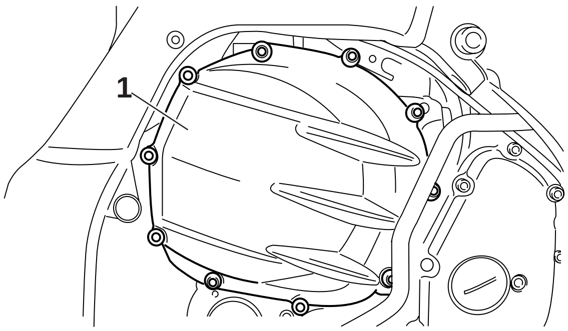
EAS3P6N001

REMOVING THE CLUTCH (FJR13AE)

1. Remove:
   - Clutch cover “1”

TIP

Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.



2. Remove:
   - Rear balancer weight
     Refer to “BALANCERS” on page 5-136.
3. Remove:
   - Clutch spring bolt

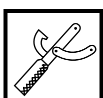
TIP

Loosen the clutch spring bolts in stages and in a crisscross pattern.

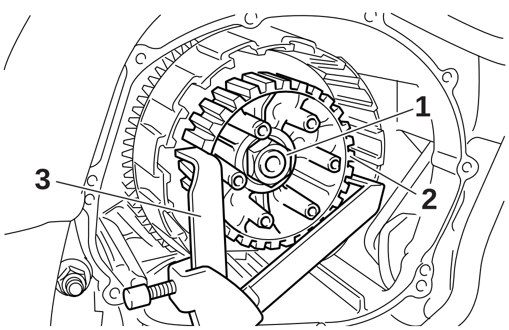
4. Straighten the lock washer tab.
5. Loosen:
   - Clutch boss nut “1”

TIP

While holding the clutch boss “2” with the universal clutch holder “3”, loosen the clutch boss nut.



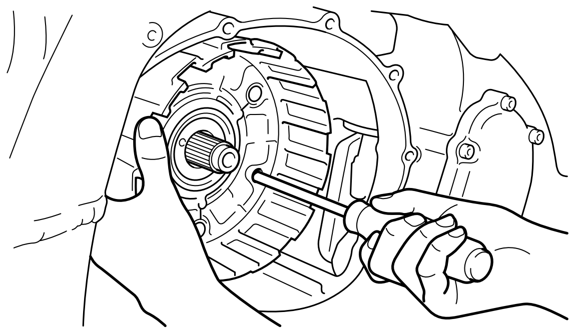
Universal clutch holder
90890-04086
YM-91042

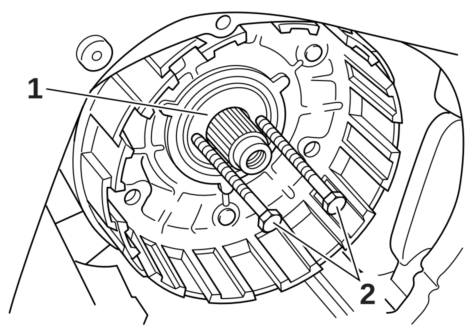


6. Remove:
   - Spacer “1”
   - Clutch housing

TIP

- Insert a cross-headed screwdriver into one of the holes of the clutch housing and primary driven gear, and then rotate the inner primary driven gear until both primary drive gears are aligned. The teeth of both primary driven gears must be aligned for installation.
- Insert two 5 mm bolts “2” into the spacer and then remove the spacer by pulling on the bolts.





EAS25100

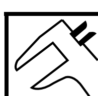
CHECKING THE FRICTION PLATES

The following procedure applies to all of the friction plates.

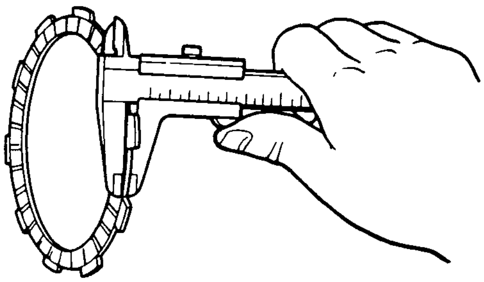
1. Check:
   - Friction plate
     Damage/wear → Replace the friction plates as a set.
2. Measure:
   - Friction plate thickness
     Out of specification → Replace the friction plates as a set.

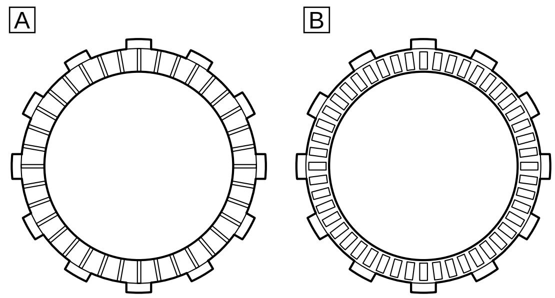
TIP

Measure the friction plate at four places.



Friction plate thickness
2.90–3.10 mm (0.114–0.122 in)
Wear limit
2.80 mm (0.1102 in)



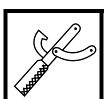


A. Friction plate 1, 3
B. Friction plate 2

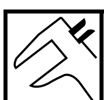
EAS25110
CHECKING THE CLUTCH PLATES

The following procedure applies to all of the clutch plates.

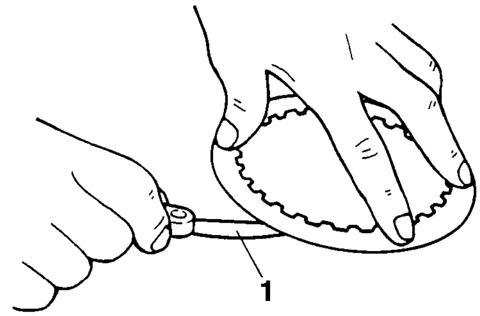
1. Check:
   - Clutch plate
     Damage → Replace the clutch plates as a set.
2. Measure:
   - Clutch plate warpage
     (with a surface plate and thickness gauge “1”)
     Out of specification → Replace the clutch plates as a set.



Thickness gauge
90890-03180
Feeler gauge set
YU-26900-9



Clutch plate thickness
1.90–2.10 mm (0.075–0.083 in)
Warpage limit
0.10 mm (0.0039 in)



EAS25130
CHECKING THE CLUTCH SPRING PLATE

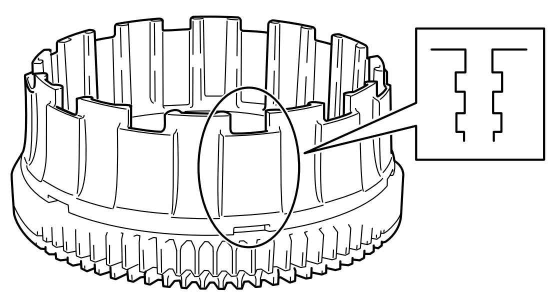
1. Check:
   - Clutch spring plate
     Damage → Replace.
2. Check:
   - Clutch spring plate seat
     Damage → Replace.

EAS25150
CHECKING THE CLUTCH HOUSING

1. Check:
   - Clutch housing dogs
     Damage/pitting/wear → Deburr the clutch housing dogs or replace the clutch housing.

TIP

Pitting on the clutch housing dogs will cause erratic clutch operation.



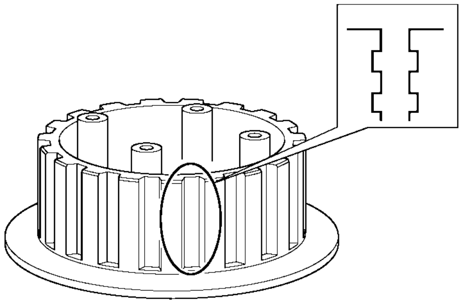
2. Check:
   - Bearing
     Damage/wear → Replace the bearing and clutch housing.

EAS25160
CHECKING THE CLUTCH BOSS

1. Check:
   - Clutch boss splines
     Damage/pitting/wear → Replace the clutch boss.

TIP

Pitting on the clutch boss splines will cause erratic clutch operation.



EAS25170

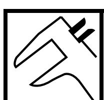
CHECKING THE PRESSURE PLATE

1. Check:
   - Pressure plate
     Cracks/damage → Replace.
   - Bearing
     Damage/wear → Replace.

EAS25190

CHECKING THE CLUTCH PUSH RODS

1. Check:
   - O-ring
   - Short clutch push rod
   - Long clutch push rod
   - Ball
     Cracks/damage/wear → Replace the defective part(s).
2. Measure:
   - Long clutch push rod bending limit
     Out of specification → Replace the long clutch push rod.

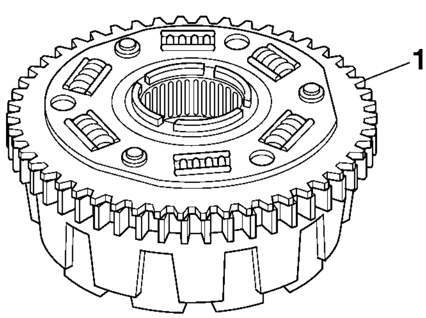


Long clutch push rod bending limit
0.37 mm (0.015 in)

EAS25210

CHECKING THE PRIMARY DRIVEN GEAR

1. Check:
   - Primary driven gear "1"
     Damage/wear → Replace the primary drive and primary driven gears as a set.
     Excessive noise during operation → Replace the clutch housing and crankshaft as a set.



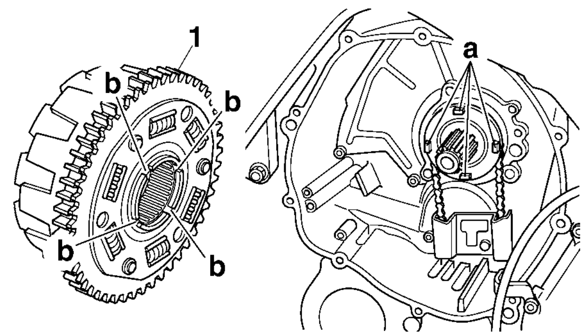
EAS25250

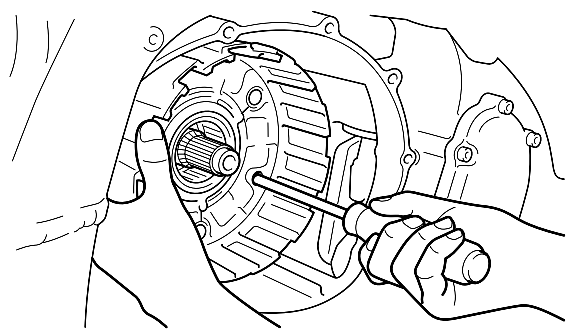
INSTALLING THE CLUTCH (FJR13A)

1. Install:
   - Clutch housing "1"

TIP

- Make sure that the projections "a" in the clutch housing align with the slots "b" in the oil pump drive sprocket.
- Make sure that the primary driven gear teeth and primary drive gear teeth mesh correctly.
- Insert a cross-headed screwdriver into one of the holes of the clutch housing and primary driven gear, and then rotate the inner primary driven gear until both primary drive gears are aligned. The teeth of both primary driven gears must be aligned for installation.

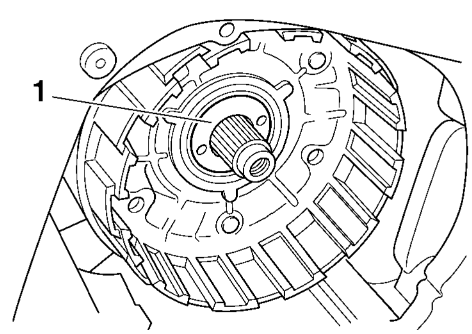




2. Install:
   - Spacer "1"

TIP

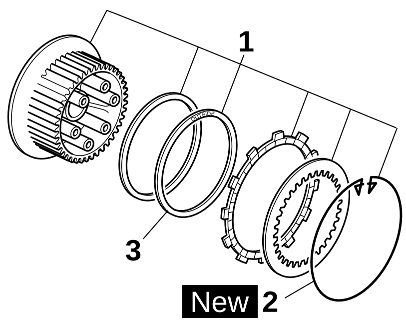
Install the spacer with the two screw holes facing towards the clutch boss.



3. Install:
   - Clutch boss assembly “1”

TIP

- If the wire circlip “2” has been removed, carefully install a new one.
- Install the clutch damper spring “3” with the “OUTSIDE” mark facing out.



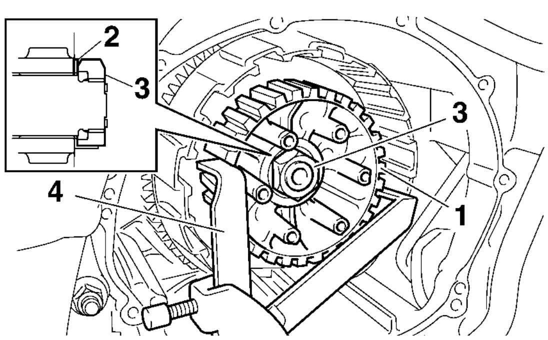
4. Install:
   - Clutch boss “1”
   - Lock washer “2” New
   - Clutch boss nut “3”

	Clutch boss nut **90 Nm (9.0 m·kg, 65 ft·lb)**

TIP

- Install the clutch boss nut with its large inner diameter side facing inward as shown in the illustration.
- While holding the clutch boss with the universal clutch holder “4”, tighten the clutch boss nut.

	Universal clutch holder **90890-04086** **YM-91042**



5. Bend the lock washer tab along a flat side of the nut.
6. Lubricate:
   - Friction plates
   - Clutch plates
     (with the recommended lubricant)

	Recommended lubricant **Engine oil**

7. Install:
   - Friction plates
   - Clutch plates

TIP

First, install a friction plate and then alternate between a clutch plate and a friction plate.

8. Install:
   - Clutch spring bolts

	Clutch spring bolt **8 Nm (0.8 m·kg, 5.8 ft·lb)**

TIP

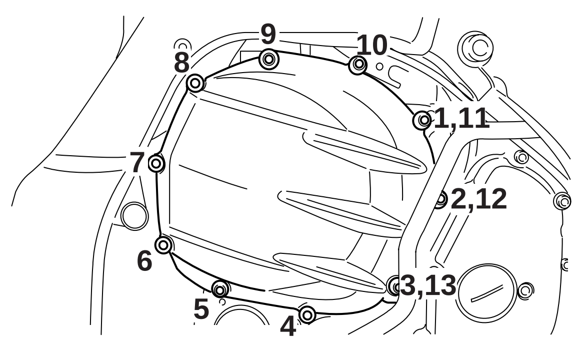
Tighten the clutch spring bolts in stages and in a crisscross pattern.

9. Install:
   - Rear balancer weight
     Refer to “BALANCERS” on page 5-136.
10. Install:
    - Clutch cover

	Clutch cover bolt **12 Nm (1.2 m·kg, 8.7 ft·lb)**

TIP

Tighten the clutch cover bolts in the proper tightening sequence as shown.



EAS3P6N002

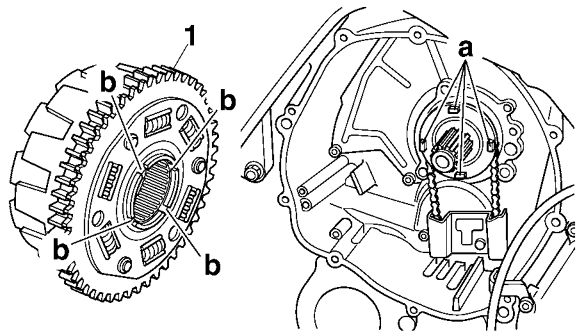
INSTALLING THE CLUTCH (FJR13AE)

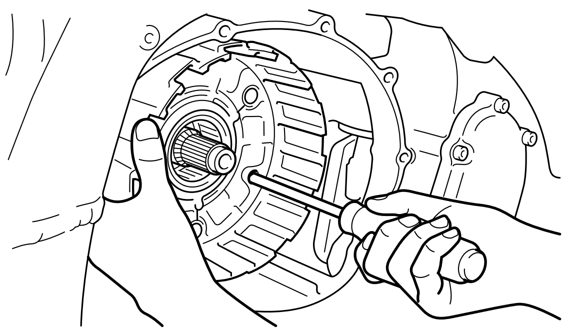
1. Install:
   - Clutch housing “1”

TIP

- Make sure that the projections “a” in the clutch housing align with the slots “b” in the oil pump drive sprocket.

- Make sure that the primary driven gear teeth and primary drive gear teeth mesh correctly.
- Insert a cross-headed screwdriver into one of the holes of the clutch housing and primary driven gear, and then rotate the inner primary driven gear until both primary drive gears are aligned. The teeth of both primary driven gears must be aligned for installation.

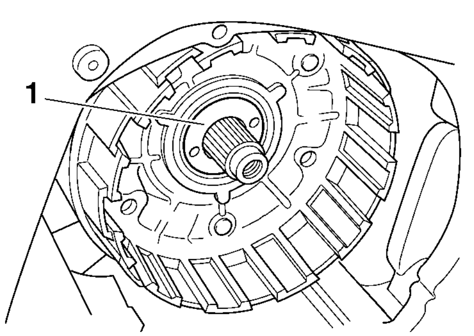




2. Install:
   - Spacer “1”

TIP

Install the spacer with the two screw holes facing towards the clutch boss.



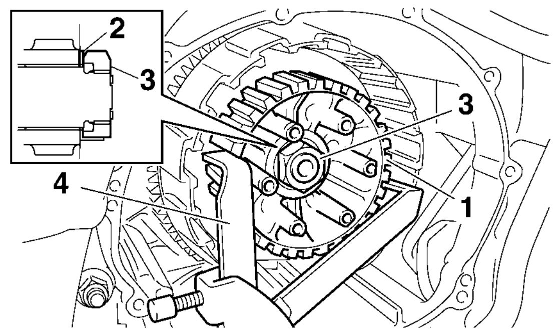
3. Install:
   - Clutch boss “1”
   - Lock washer “2” New
   - Clutch boss nut “3”

	Clutch boss nut **90 Nm (9.0 m·kg, 65 ft·lb)**

TIP

- Install the clutch boss nut with its large inner diameter side facing inward as shown in the illustration.
- While holding the clutch boss with the universal clutch holder “4”, tighten the clutch boss nut.

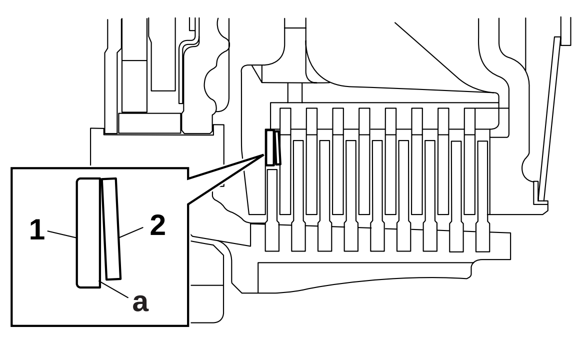
	Universal clutch holder **90890-04086** **YM-91042**



4. Bend the lock washer tab along a flat side of the nut.
5. Install:
   - Clutch damper spring seat “1”
   - Clutch damper spring “2”

TIP

- Install the clutch damper spring seat with the white paint mark and the sharp edge “a” facing outward.
- Install the clutch damper spring as shown in the illustration.



6. Lubricate:
   - Friction plates
   - Clutch plates
   (with the recommended lubricant)

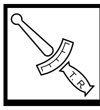
	Recommended lubricant **Engine oil**

7. Install:
   - Friction plates
   - Clutch plates

TIP

First, install a friction plate and then alternate between a clutch plate and a friction plate.

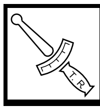
8. Install:
   - Clutch spring bolts

	**Clutch spring bolt** **8 Nm (0.8 m·kg, 5.8 ft·lb)**

TIP

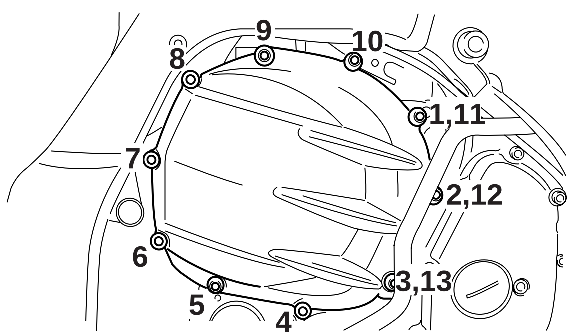
Tighten the clutch spring bolts in stages and in a crisscross pattern.

9. Install:
   - Rear balancer weight
     Refer to “BALANCERS” on page 5-136.
10. Install:
   - Clutch cover

	**Clutch cover bolt** **12 Nm (1.2 m·kg, 8.7 ft·lb)**

TIP

Tighten the clutch cover bolts in the proper tightening sequence as shown.



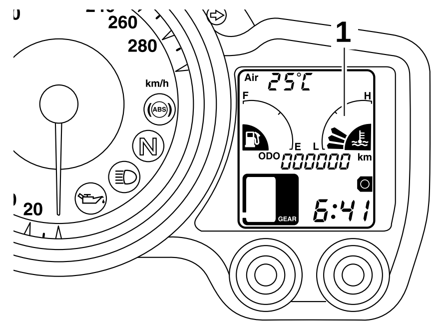
ET3P66068

BREAKING IN THE FRICTION PLATES AFTER REPLACEMENT (FJR13AE only)

1. If the friction plates are replaced, perform the following procedure to break them in.

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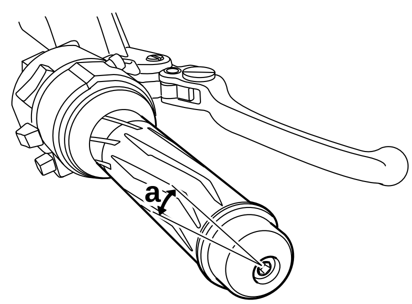
a. Start the engine and warm it up until at least three segments appear on the coolant temperature meter “1” as shown in the illustration.



b. Apply the rear brake forcefully.
c. Shift the transmission into 1st gear.
d. Turn the throttle grip to 1/4 “a” of the fully open position ten times, each time for less than 0.5 second.

TIP

It is not unusual for the engine to stall when performing this procedure. If the engine stalls, restart the engine, let it idle for at least 90 seconds, and then repeat steps (b) to (d).



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EAS25280

DISASSEMBLING THE CLUTCH MASTER CYLINDER

ECA13840

NOTICE

- **Clutch components rarely require disassembly.**
- **Therefore, always follow these preventive measures:**
- **Never disassemble clutch components unless absolutely necessary.**
- **If any connection on the hydraulic clutch system is disconnected, the entire clutch system must be disassembled, drained, cleaned, properly filled, and bled after reassembly.**
- **Never use solvents on internal clutch components.**
- **Use only clean or new clutch fluid for cleaning clutch components.**

- **Clutch fluid may damage painted surfaces and plastic parts. Therefore, always clean up any spilt fluid immediately.**
- **Avoid clutch fluid coming into contact with the eyes as it can cause serious injury.**
- **First aid for clutch fluid entering the eyes:**
- **Flush with water for 15 minutes and get immediate medical attention.**

TIP

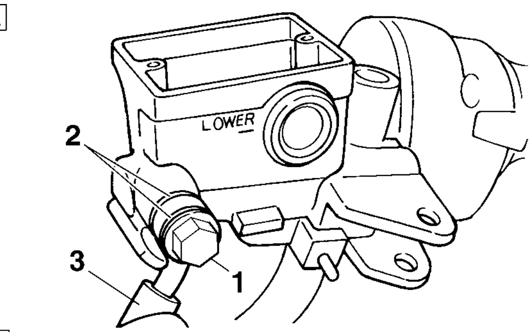
Before disassembling the clutch master cylinder, drain the clutch fluid from the entire clutch system.

1. Remove:
   - Clutch hose union bolt “1”
   - Copper washers “2”
   - Clutch hose “3”

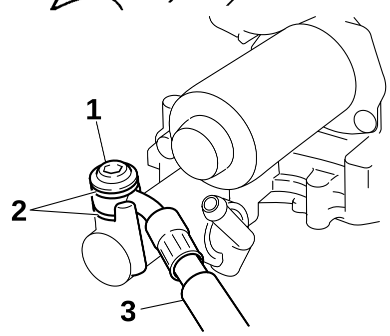
TIP

To collect any remaining clutch fluid, place a container under the master cylinder and the end of the clutch hose.

A



B



A. FJR13A
B. FJR13AE

EAS25290

CHECKING THE CLUTCH MASTER CYLINDER

Recommended clutch component replacement schedule	
Piston seal	Every two years
Clutch hose	Every four years
Clutch fluid	Every two years and whenever the clutch is disassembled

1. Check:
   - Clutch master cylinder body
     Cracks/damage → Replace the clutch master cylinder.
   - Clutch fluid delivery passage
     (clutch master cylinder body)
     Obstruction → Blow out with compressed air.
2. Check:
   - Clutch master cylinder
   - Clutch master cylinder kit
     Rust/scratches/wear → Replace the clutch master cylinder and clutch master cylinder kit as a set.
3. Check:
   - Clutch master cylinder reservoir
     Cracks/damage → Replace.
   - Clutch master cylinder reservoir diaphragm
     Damage/wear → Replace.
4. Check:
   - Clutch hose
     Cracks/damage/wear → Replace.

EAS25300

ASSEMBLING THE CLUTCH MASTER CYLINDER

EW3P61015

WARNING

- **Before installation, all internal clutch components must be cleaned and lubricated with clean or new clutch fluid.**
- **Never use solvents on internal clutch components.**

Recommended fluid
DOT 4

EAS25310

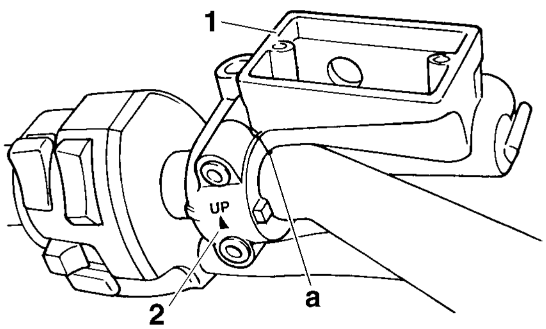
INSTALLING THE CLUTCH MASTER CYLINDER (FJR13A)

1. Install:
   - Clutch master cylinder “1”
   - Clutch master cylinder holder “2”

EW3P61016

⚠ WARNING

- **Install the clutch lever holder with the "UP" mark facing up.**
- **Align the end of the clutch lever holder with the punch mark "a" on the left handlebar.**
- **First, tighten the upper bolt, then the lower bolt.**



2. Install:
   - Copper washers "1" **New**
   - Clutch hose "2"
   - Clutch hose union bolt "3"

	Clutch hose union bolt **30 Nm (3.0 m·kg, 22 ft·lb)**

EW3P61017

⚠ WARNING

Proper clutch hose routing is essential to insure safe vehicle operation. Refer to "CABLE ROUTING (FJR13A)" on page 2-45.

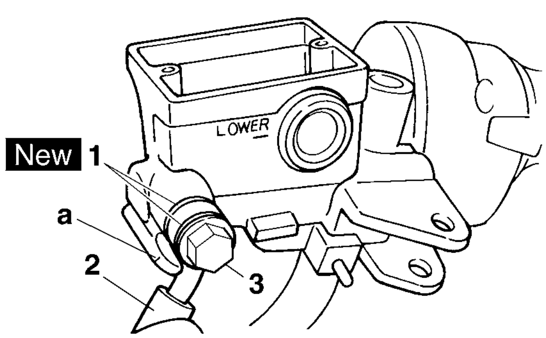
EC3P61034

NOTICE

When installing the clutch hose onto the clutch master cylinder, make sure the clutch pipe touches the projection "a" as shown.

TIP

Turn the handlebars to the left and to the right to make sure the clutch hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.



3. Fill:
   - Clutch master cylinder reservoir
     (with the specified amount of the recommended clutch fluid)

	Recommended fluid **DOT 4**

EWA13370

⚠ WARNING

- **Use only the designated clutch fluid. Other clutch fluids may cause the rubber seals to deteriorate, causing leakage and poor clutch performance.**
- **Refill with the same type of clutch fluid that is already in the system. Mixing clutch fluids may result in a harmful chemical reaction, leading to poor clutch performance.**
- **When refilling, be careful that water does not enter the clutch fluid reservoir. Water will significantly lower the boiling point of the clutch fluid and could cause vapor lock.**

ECA13420

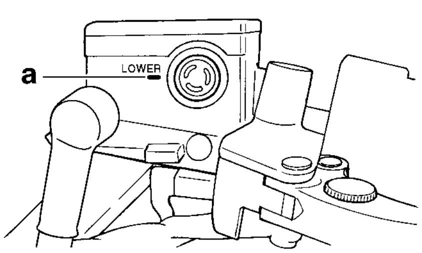
NOTICE

Clutch fluid may damage painted surfaces or plastic parts. Therefore, always clean up any spilt clutch fluid immediately.

TIP

In order to ensure a correct reading of the clutch fluid level, make sure the top of the reservoir is horizontal.

4. Bleed:
   - Clutch system
     Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13A)" on page 3-18.
5. Check:
   - Clutch fluid level
     Below the minimum level mark "a" → Add the recommended clutch fluid to the proper level.
     Refer to "CHECKING THE CLUTCH FLUID LEVEL (FJR13A)" on page 3-17.



6. Check:
   - Clutch lever operation
     Soft or spongy feeling → Bleed the clutch system.
     Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13A)” on page 3-18.

ET3P66045

INSTALLING THE CLUTCH MASTER CYLINDER (FJR13AE)

1. Install:
   - Copper washers “1” New
   - Clutch hose “2”
   - Clutch hose union bolt “3”

T.R.	**Clutch hose union bolt** **30 Nm (3.0 m·kg, 22 ft·lb)**

EW3P66001

WARNING

Proper clutch hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING (FJR13AE)” on page 2-65.

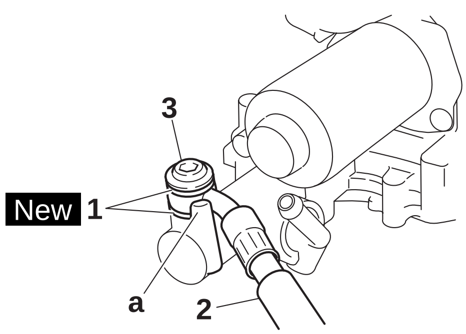
EC3P61034

NOTICE

When installing the clutch hose onto the clutch master cylinder, make sure the clutch pipe touches the projection “a” as shown.

TIP

Turn the handlebars to the left and to the right to make sure the clutch hose does not touch other parts (e.g., wire harness, cables, leads). Correct if necessary.



2. Fill:
   - Clutch master cylinder reservoir
     (with the specified amount of the recommended clutch fluid)

	Recommended fluid **DOT 4**

EWA13370

WARNING

- **Use only the designated clutch fluid. Other clutch fluids may cause the rubber seals to deteriorate, causing leakage and poor clutch performance.**
- **Refill with the same type of clutch fluid that is already in the system. Mixing clutch fluids may result in a harmful chemical reaction, leading to poor clutch performance.**
- **When refilling, be careful that water does not enter the clutch fluid reservoir. Water will significantly lower the boiling point of the clutch fluid and could cause vapor lock.**

ECA13420

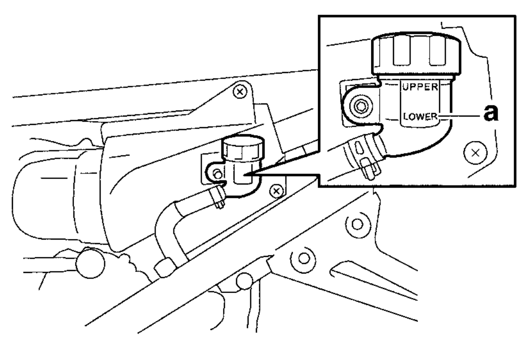
NOTICE

Clutch fluid may damage painted surfaces or plastic parts. Therefore, always clean up any spilt clutch fluid immediately.

TIP

In order to ensure a correct reading of the clutch fluid level, make sure the top of the reservoir is horizontal.

3. Bleed:
   - Clutch system
     Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)” on page 3-19.
4. Check:
   - Clutch fluid level
     Below the minimum level mark “a” → Add the recommended clutch fluid to the proper level.
     Refer to “CHECKING THE CLUTCH FLUID LEVEL (FJR13AE)” on page 3-18.



ET3P66069

REPLACING THE CLUTCH MASTER CYLINDER (FJR13AE only)

1. Check:
   - Pressure plate stroke
     Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)” on page 3-19.

2. Replace:
   • Clutch master cylinder kit

TIP

For 2009 models or later, do not use the shim that is included in the replacement clutch master cylinder kit.

3. Bleed:
   • Hydraulic clutch system
   Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)" on page 3-19.
4. Check:
   • Pressure plate stroke
   Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)" on page 3-19.
5. Adjust:
   • Clutch engagement point
   Refer to "Diagnostic code table (Diagnostic code No. Sh_ _66)".

Pressure plate stroke	Action
Pressure plate stroke before replacing the clutch master cylinder kit was 2.90 mm (0.11 in) or more, or the difference in the pressure plate stroke before and after replacing is 0.10 mm (0.004 in) or more	Select diagnostic code No. Sh_ _66 in the diagnostic mode and operate the hand shift lever switch (shift up) two times.
For all other cases	No adjustment is necessary.

6. Check:
   • Rear wheel drag torque
   Refer to "CHECKING THE VEHICLE AFTER BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE only)" on page 3-21.
7. Check:
   • Shift operation
   Refer to "CHECKING THE VEHICLE AFTER BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE only)" on page 3-21.
8. Check:
   • Starting-off performance of vehicle
   Refer to "CHECKING THE VEHICLE AFTER BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE only)" on page 3-21.

ET3P66070

INSTALLING THE CLUTCH ACTUATOR (FJR13AE only)

1. Install:
   • Clutch actuator
   • Clutch master cylinder
   • Clutch hose
   • Clutch fluid reservoir hose
2. Bleed:
   • Hydraulic clutch system
   Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)" on page 3-19.
3. Check:
   • Pressure plate stroke
   Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)" on page 3-19.
4. Adjust:
   • Clutch engagement point
   Refer to "Diagnostic code table (Diagnostic code No. Sh_ _66)".

TIP

Adjust the clutch engagement point if the clutch actuator was replaced.

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Select diagnostic code No. Sh_ _66 in the diagnostic mode and operate the hand shift lever switch (shift up) until the clutch engagement point is at the maximum setting.

TIP

The hand shift select indicator light stops coming on when the maximum setting is reached.

b. Operate the hand shift lever switch (shift down) ten times and check that the hand shift select indicator light comes on.

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5. Check:
   • Rear wheel drag torque
   Refer to "CHECKING THE VEHICLE AFTER BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE only)" on page 3-21.
6. Check:
   • Shift operation
   Refer to "CHECKING THE VEHICLE AFTER BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE only)" on page 3-21.
7. Check:
   • Starting-off performance of vehicle
   Refer to "CHECKING THE VEHICLE AFTER BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE only)" on page 3-21.

ET3P61024

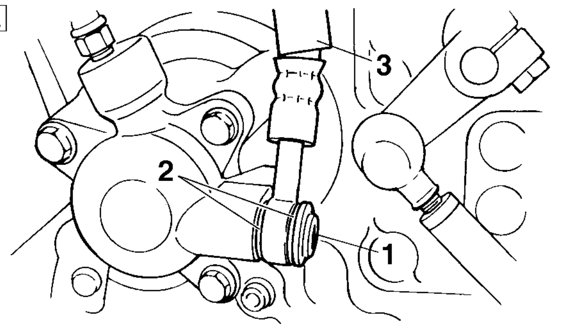
REMOVING THE CLUTCH RELEASE CYLINDER

1. Remove:
   - Clutch hose union bolt “1”
   - Copper washers “2”
   - Clutch hose “3”

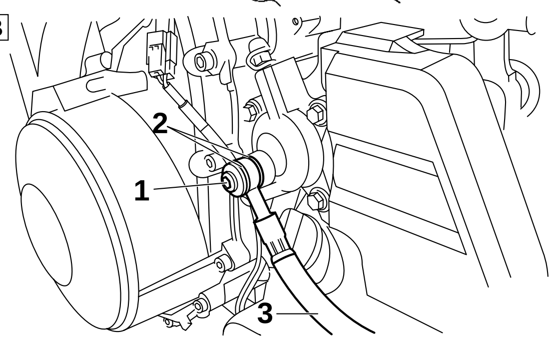
TIP

Put the end of the clutch hose into a container and pump out the clutch fluid carefully.

A



B



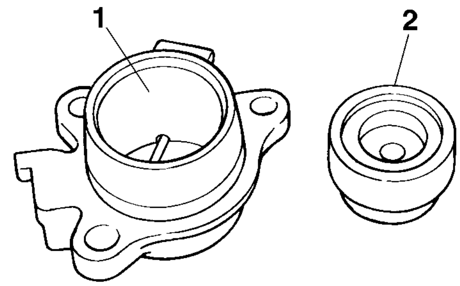
A. FJR13A

B. FJR13AE

EAS25330

CHECKING THE CLUTCH RELEASE CYLINDER

1. Check:
   - Clutch release cylinder body
     Cracks/damage → Replace the clutch release cylinder.
2. Check:
   - Clutch release cylinder “1”
   - Clutch release cylinder piston “2”
     Rust/scratches/wear → Replace the clutch release cylinder and clutch release cylinder piston as a set.



EAS25340

ASSEMBLING THE CLUTCH RELEASE CYLINDER

EW3P61018

WARNING

- **Before installation, all internal clutch components must be cleaned and lubricated with clean or new clutch fluid.**
- **Never use solvents on internal clutch components as they will cause the piston seal to swell and distort.**
- **Whenever a clutch release cylinder is disassembled, replace the piston seal.**

	Recommended fluid **DOT 4**

EAS25350

INSTALLING THE CLUTCH RELEASE CYLINDER

1. Check:
   - Copper washers “1” New
   - Clutch hose “2”
   - Clutch hose union bolt “3”

	Clutch hose union bolt **30 Nm (3.0 m·kg, 22 ft·lb)**

EW3P66003

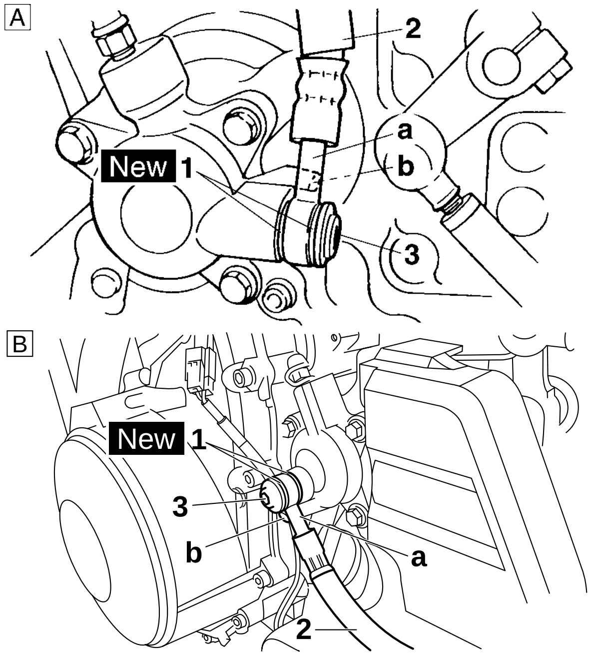
WARNING

Proper clutch hose routing is essential to insure safe vehicle operation. Refer to “CABLE ROUTING (FJR13A)” on page 2-45 and “CABLE ROUTING (FJR13AE)” on page 2-65.

EC3P61035

NOTICE

When installing the clutch hose onto the clutch release cylinder, make sure the pipe “a” touches the projection “b” on the clutch release cylinder body.



A. FJR13A
B. FJR13AE

2. Fill:
   - Clutch master cylinder reservoir
     (with the specified amount of the recommended clutch fluid)

	Recommended fluid **DOT 4**

EWA13370

⚠ WARNING

- **Use only the designated clutch fluid. Other clutch fluids may cause the rubber seals to deteriorate, causing leakage and poor clutch performance.**
- **Refill with the same type of clutch fluid that is already in the system. Mixing clutch fluids may result in a harmful chemical reaction, leading to poor clutch performance.**
- **When refilling, be careful that water does not enter the clutch fluid reservoir. Water will significantly lower the boiling point of the clutch fluid and could cause vapor lock.**

ECA13420

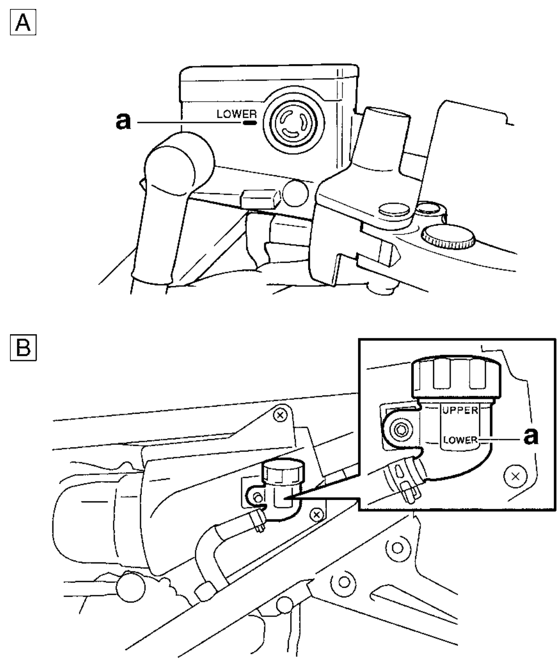
NOTICE

Clutch fluid may damage painted surfaces or plastic parts. Therefore, always clean up any spilt clutch fluid immediately.

TIP

In order to ensure a correct reading of the clutch fluid level, make sure that the top of the reservoir is horizontal.

3. Bleed:
   - Clutch system
     Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13A)” on page 3-18 and “BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)” on page 3-19.
4. Check:
   - Clutch fluid level
     Below the minimum level mark “a” → Add the recommended clutch fluid to the proper level.
     Refer to “CHECKING THE CLUTCH FLUID LEVEL (FJR13A)” on page 3-17 and “CHECKING THE CLUTCH FLUID LEVEL (FJR13AE)” on page 3-18.

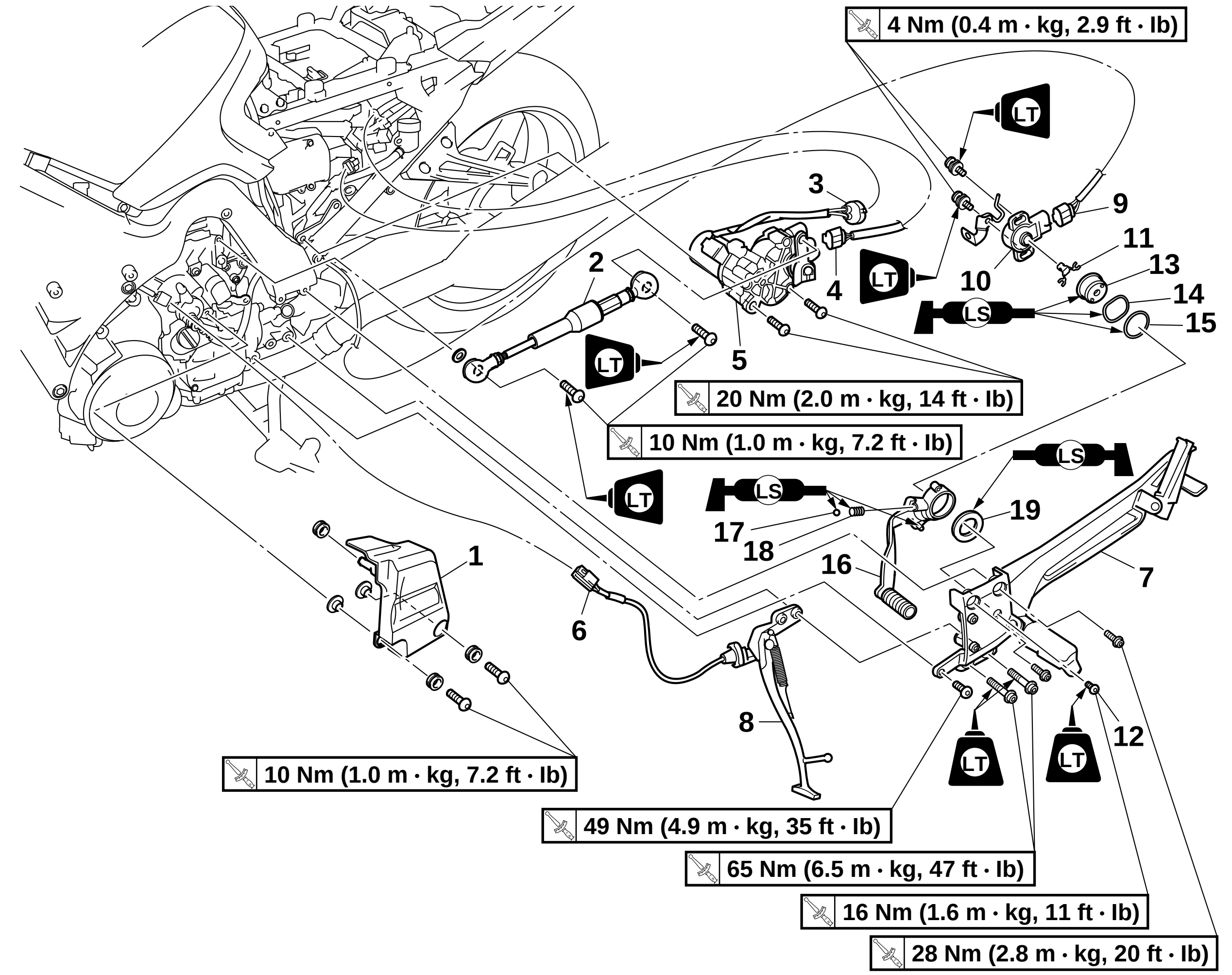


A. FJR13A
B. FJR13AE

5. Check:
   - Clutch lever operation (FJR13A)
     Soft or spongy feeling → Bleed the clutch system.
     Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13A)” on page 3-18 and “BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)” on page 3-19.

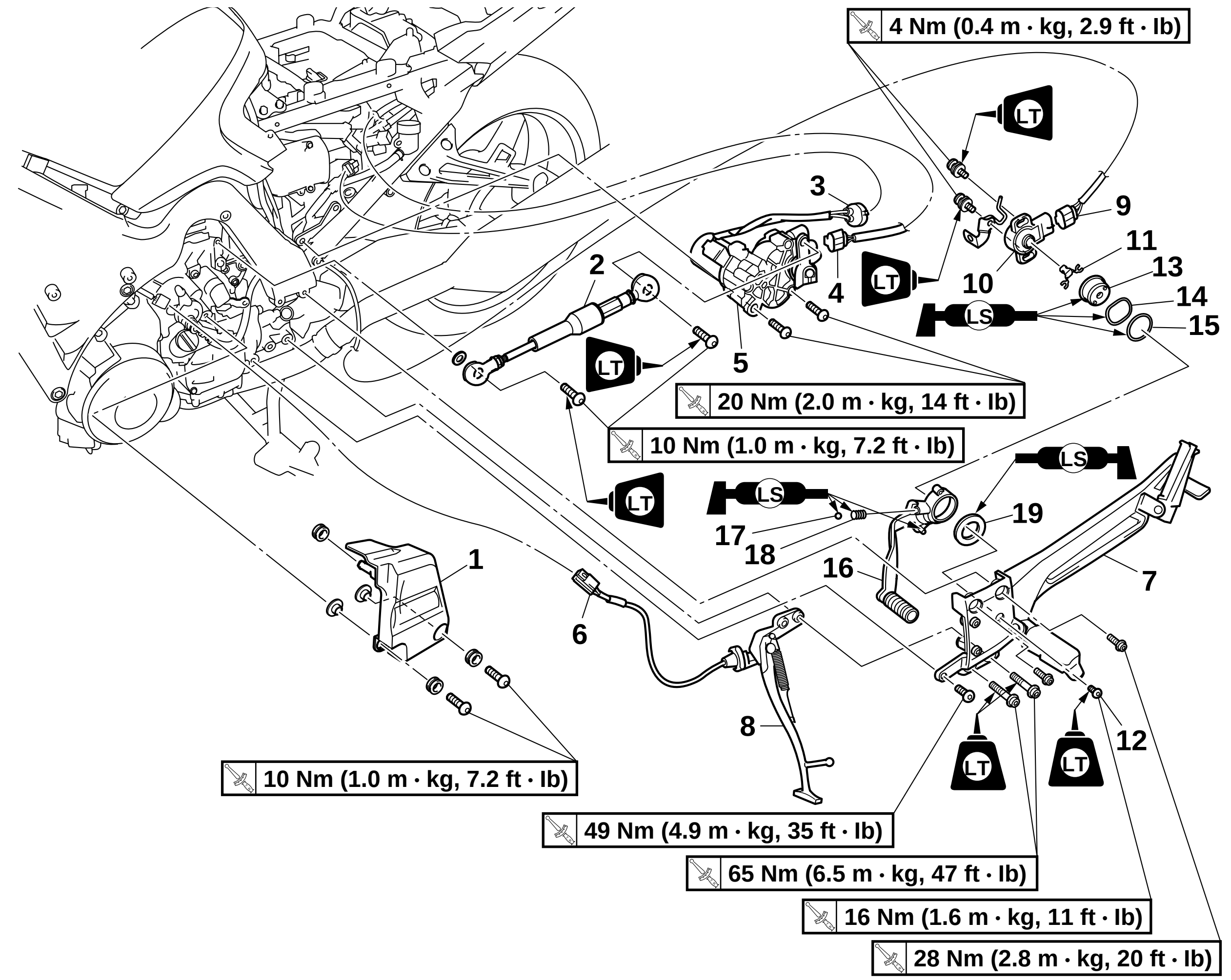
ET3P66037
SHIFT ACTUATOR AND SHIFT ROD (FJR13AE only)

Removing the shift actuator, shift rod and foot shift switch



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat/Left side cover/Air shroud		Refer to "GENERAL CHASSIS" on page 4-1.
1	Gear position sensor cover	1	
2	Shift rod	1	
3	Shift actuator sensor coupler	1	Disconnect.
4	Shift actuator motor coupler	1	Disconnect.
5	Shift actuator	1	
6	Sidestand switch coupler	1	Disconnect.
7	Left footrest assembly	1	
8	Sidestand	1	
9	Foot shift switch coupler	1	Disconnect.
10	Foot shift switch	1	
11	Holder	1	
12	Shift pedal pivot bolt	1	
13	Shift pedal pivot	1	
14	Wave washer	1	

Removing the shift actuator, shift rod and foot shift switch



Order	Job/Parts to remove	Q'ty	Remarks
15	Washer	1	
16	Shift pedal	1	
17	Ball	1	
18	Spring	1	
19	Washer	1	
			For installation, reverse the removal procedure.

ET3P66038
REMOVING THE SHIFT ACTUATOR
1. Remove:
   - Shift actuator

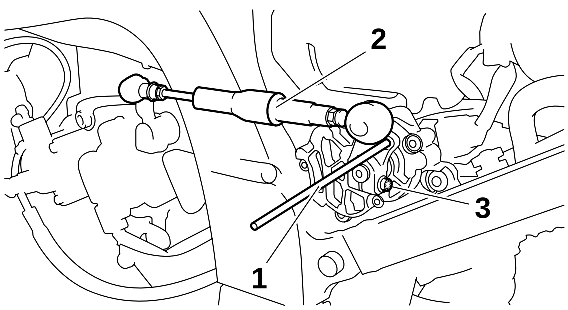
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a. Pass a suitable 5 mm diameter rod “1” through the holes in the rear shift arm and shift actuator to secure the shift rod.
b. Remove the shift rod “2”.

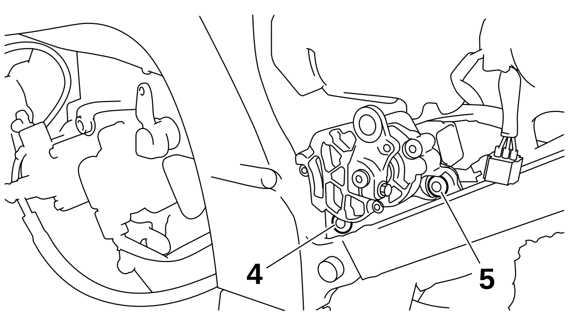
EC2D21001
NOTICE

Do not loosen the rear shift arm bolt “3” when removing the shift rod, otherwise the rear shift arm and shift actuator could become misaligned, preventing the shift rod from being installed correctly during assembly.

c. Pull out the rod from the holes.



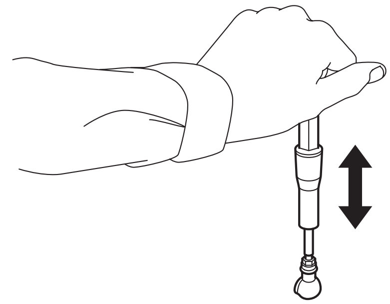
d. Disconnect the shift actuator sensor coupler and shift actuator motor coupler.
e. Remove the shift actuator front bolt “4”, and then remove the rear bolt “5”.



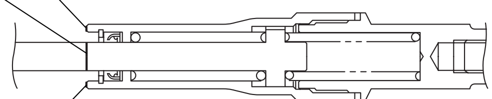
f. Remove the shift actuator.

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ET2D21008
CHECKING THE SHIFT ROD
1. Check:
   - Shift rod operation
     Rough movement → Replace.



2. Check:
   - Shift rod groove
     Groove and end of rod cover are not aligned → Replace.



1. Shift rod groove
2. End of shift rod cover

3. Check:
   - Shift rod
     Bends → Replace.

ET3P66039
INSTALLING THE FOOT SHIFT SWITCH
1. Lubricate:
   - Washers
   - Shift pedal pivot
   - Spring
   - Ball
   - Wave washer
   - Shift pedal spring
   - Shift pedal projection

	Recommended lubricant **Lithium-soap-based grease**

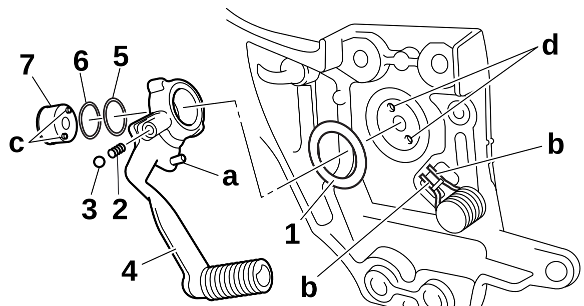
2. Install:
   - Washer “1”
   - Spring “2”
   - Ball “3”
   - Shift pedal “4”
     (to the left footrest assembly)
   - Washer “5”
   - Wave washer “6”
   - Shift pedal pivot “7”

• Shift pedal pivot bolt

Shift pedal pivot bolt **16 Nm (1.6 m·kg, 11 ft·lb)** **LOCTITE®**

TIP

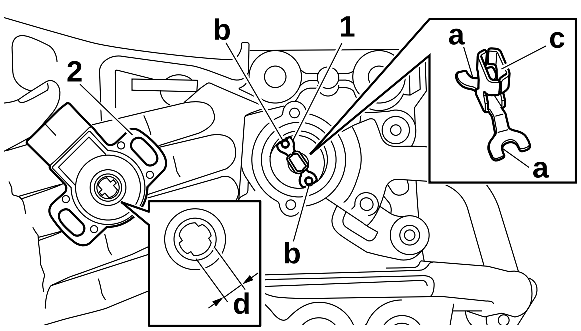
• Position the projection “a” on the shift pedal between the ends “b” of the spring on the left footrest assembly.
• Be sure to fit the projections “c” on the shift pedal pivot into the holes “d” in the left footrest assembly.

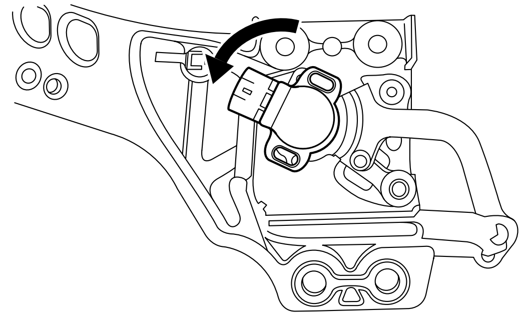


3. Install:
   • Holder “1”
   • Foot shift switch “2”

TIP

• Be sure to align the cutouts “a” in the holder with the projections “b” on the shift pedal pivot.
• Fit the foot shift switch onto the holder, and then rotate the sensor counterclockwise and temporarily install the screws. Be sure to fit the section “c” of the holder into the opening “d” shown in the illustration.





4. Adjust:
   • Foot shift switch
   Refer to “ADJUSTING THE FOOT SHIFT SWITCH” on page 5-76.

ET3P66040

ADJUSTING THE FOOT SHIFT SWITCH

1. Check:
   • Foot shift switch
   Refer to “CHECKING THE FOOT SHIFT SWITCH (FJR13AE only)” on page 8-245.
2. Adjust:
   • Foot shift switch angle

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a. Connect the foot shift switch coupler to the foot shift switch.
b. Connect the digital circuit tester to the foot shift switch coupler.

• Positive tester probe → orange “1” • Negative tester probe → black “2”

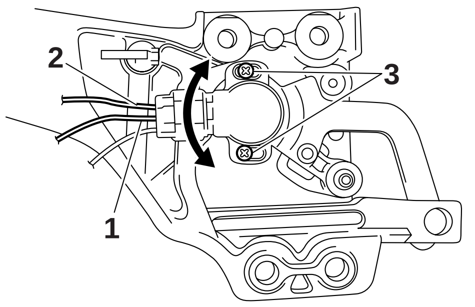
Digital circuit tester **90890-03174** **Model 88 Multimeter with tachometer** **YU-A1927**

c. Turn the main switch to “ON”.
d. Measure the foot shift switch voltage.
e. Adjust the foot shift switch angle so that the voltage is within the specified range.

Output voltage **FJR13AE 2.4–2.6 V**

f. After adjusting the foot shift switch angle, tighten the foot shift switch screws “3” to specification.

Foot shift switch screw **4 Nm (0.4 m·kg, 2.9 ft·lb)** **LOCTITE®**



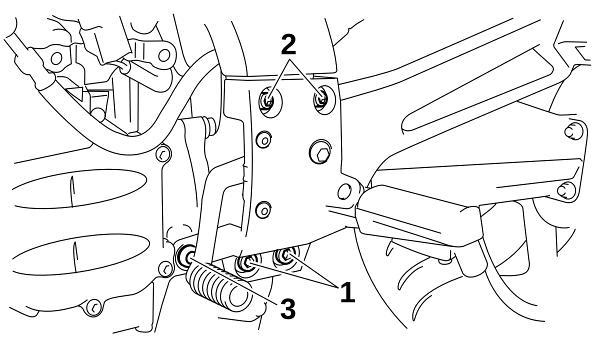
ET3P66041
INSTALLING THE LEFT FOOTREST ASSEMBLY

1. Install:
   - Sidestand
   - Left footrest assembly

Left footrest assembly/sidestand bolt
65 Nm (6.5 m·kg, 47 ft·lb)
LOCTITE®
Left footrest assembly bolt (M8)
28 Nm (2.8 m·kg, 20 ft·lb)
Left footrest assembly bolt (M10)
49 Nm (4.9 m·kg, 35 ft·lb)

TIP

Install the left footrest assembly/sidestand bolts "1", left footrest assembly bolts (M8) "2" and left footrest assembly bolt (M10) "3" temporarily and then tighten them to the specified torques in the proper tightening sequence as shown.

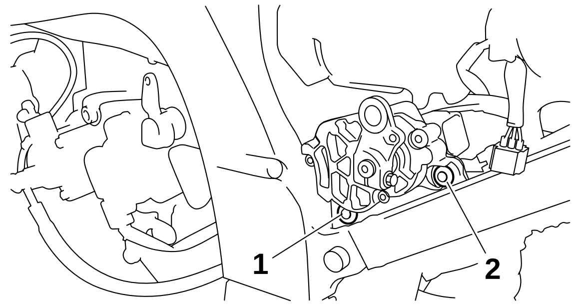


ET3P66042
INSTALLING THE SHIFT ACTUATOR

1. Install:
   - Shift actuator

a. Install the shift actuator front bolt "1" temporarily.
b. Tighten the shift actuator rear bolt "2", and then tighten the front bolt "1" to specification.

Shift actuator rear bolt
20 Nm (2.0 m·kg, 14 ft·lb)
Shift actuator front bolt
20 Nm (2.0 m·kg, 14 ft·lb)

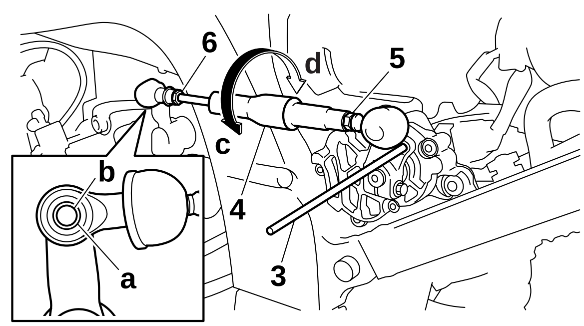


c. Connect the shift actuator motor coupler and shift actuator sensor coupler.
d. Pass a suitable 5 mm diameter rod "3" through the holes in the rear shift arm and shift actuator to secure the shift rod.
e. Install the shift rod "4".

TIP

Check that the hole "a" in the shift rod is aligned with the hole "b" in the front shift arm. If the holes are not aligned, loosen the shift rod rear locknut "5" and front locknut "6", and then turn the shift rod to adjust its length.

Direction "c"
Shift rod length is increased.
Direction "d"
Shift rod length is decreased.



f. Tighten the shift rod bolts to specification.

Shift rod bolt
10 Nm (1.0 m·kg, 7.2 ft·lb)

g. If the shift rod front locknut and rear locknut were loosened, tighten them to specification.

Shift rod front locknut
7 Nm (0.7 m·kg, 5.1 ft·lb)
Shift rod rear locknut
10 Nm (1.0 m·kg, 7.2 ft·lb)

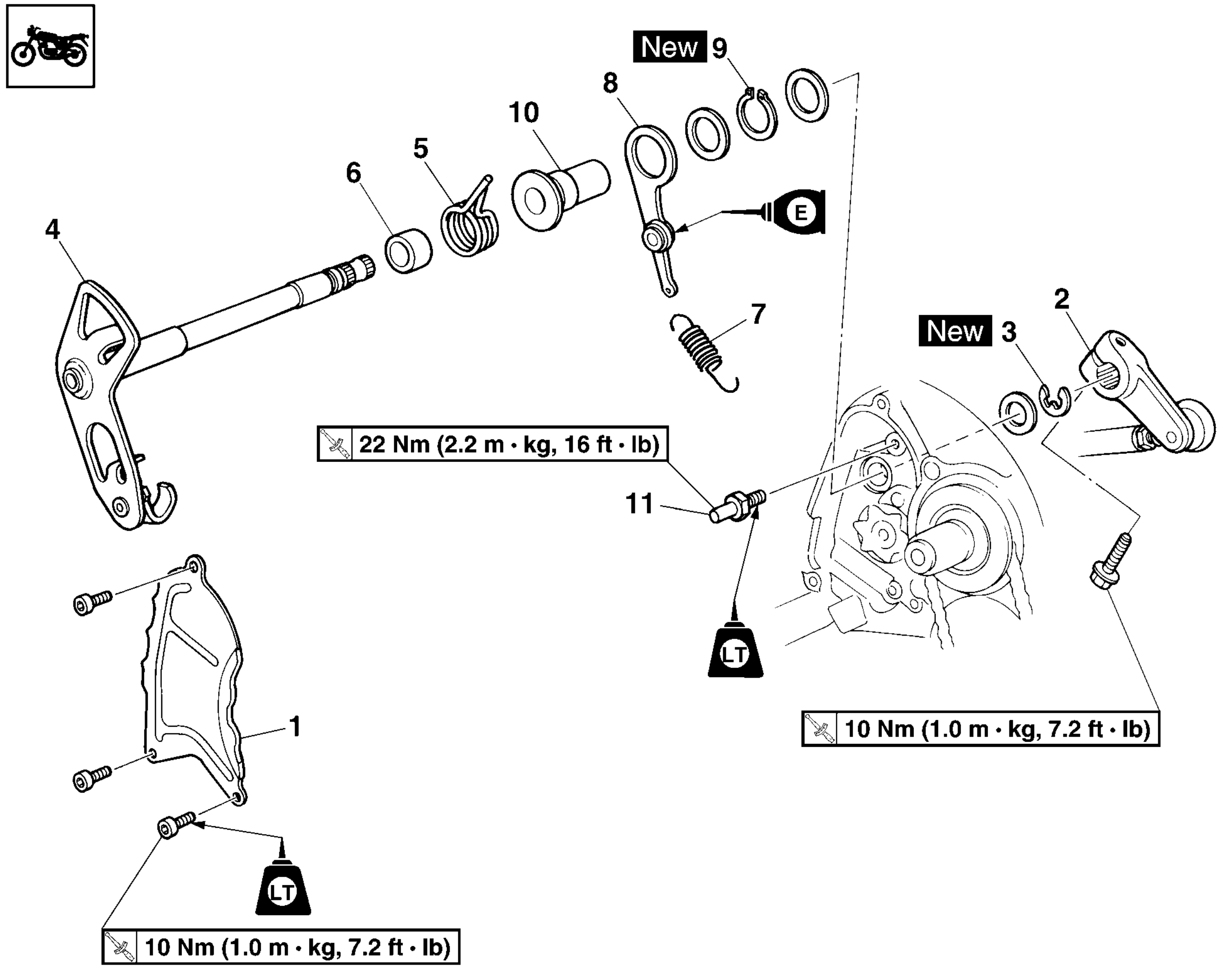
h. Pull out the rod from the holes.

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EAS25410

SHIFT SHAFT

Removing the shift shaft and stopper lever



Order	Job/Parts to remove	Q'ty	Remarks
	Clutch housing		Refer to "CLUTCH" on page 5-46.
	Shift rod		FJR13AE Refer to "SHIFT ACTUATOR AND SHIFT ROD (FJR13AE only)" on page 5-73.
1	Oil baffle plate 1	1	
2	Shift arm	1	
3	Circlip	1	
4	Shift shaft	1	
5	Shift shaft spring	1	
6	Spacer	1	
7	Stopper lever spring	1	
8	Stopper lever	1	
9	Circlip	1	
10	Collar	1	
11	Shift shaft spring stopper	1	
			For installation, reverse the removal procedure.

EAS25420

CHECKING THE SHIFT SHAFT

1. Check:
   - Shift shaft
     Bends/damage/wear → Replace.
   - Shift shaft spring
     Damage/wear → Replace.

EAS25430

CHECKING THE STOPPER LEVER

1. Check:
   - Stopper lever
     Bends/damage → Replace.
     Roller turns roughly → Replace the stopper lever.
   - Shift lever spring
     Damage/wear → Replace.

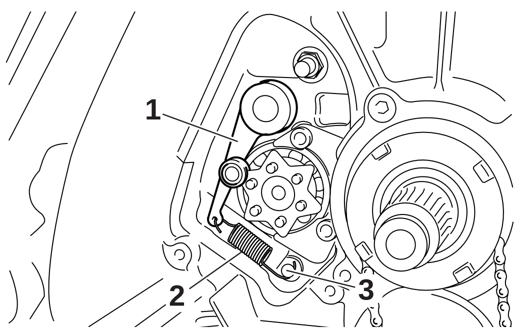
EAS25450

INSTALLING THE SHIFT SHAFT (FJR13A)

1. Install:
   - Stopper lever “1”
   - Stopper lever spring “2”

TIP

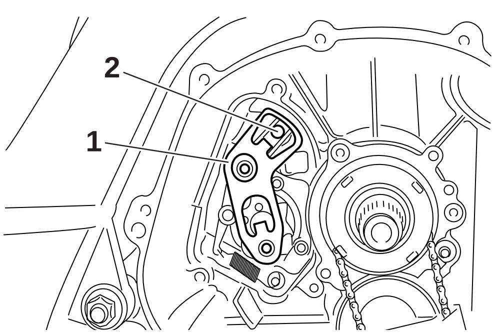
- Hook the ends of the stopper lever spring onto the stopper lever and the crankcase boss “3”.
- Mesh the stopper lever with the shift drum segment assembly.



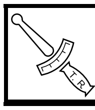
2. Install:
   - Shift shaft “1”

TIP

Hook the end of the shift shaft spring onto the shift shaft spring stopper “2”.

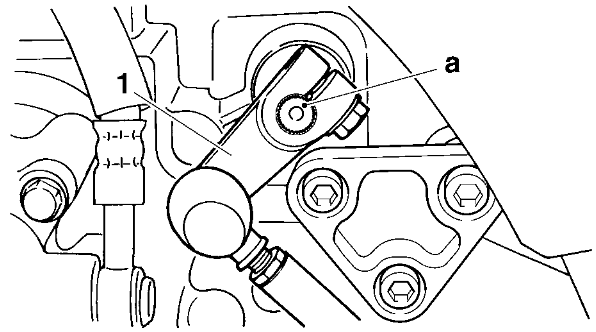


3. Install:
   - Shift arm “1”

	**Shift arm bolt** **10 Nm (1.0 m·kg, 7.2 ft·lb)**

TIP

Align the punch mark “a” in the shift shaft with the slot in the shift arm.



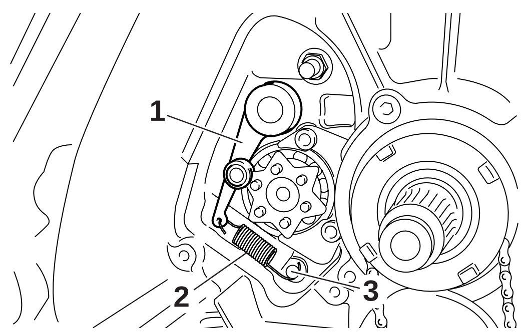
ET3P66043

INSTALLING THE SHIFT SHAFT (FJR13AE)

1. Install:
   - Stopper lever “1”
   - Stopper lever spring “2”

TIP

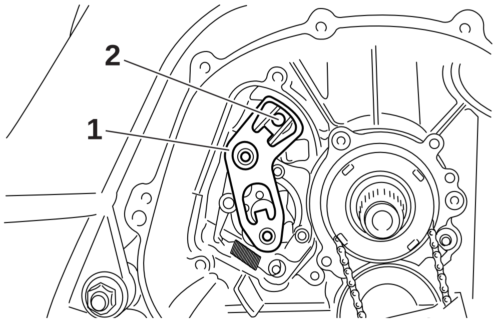
- Hook the ends of the stopper lever spring onto the stopper lever and the crankcase boss “3”.
- Mesh the stopper lever with the shift drum segment assembly.



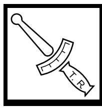
2. Install:
   - Shift shaft “1”

TIP

Hook the end of the shift shaft spring onto the shift shaft spring stopper “2”.



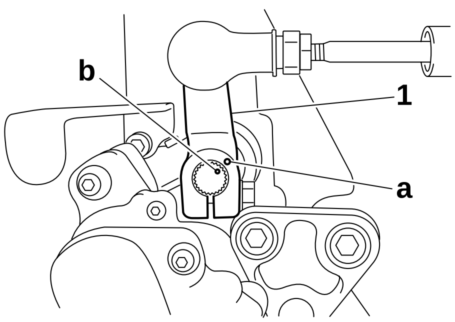
3. Install:
   - Front shift arm “1”



Front shift arm bolt
10 Nm (1.0 m·kg, 7.2 ft·lb)

TIP

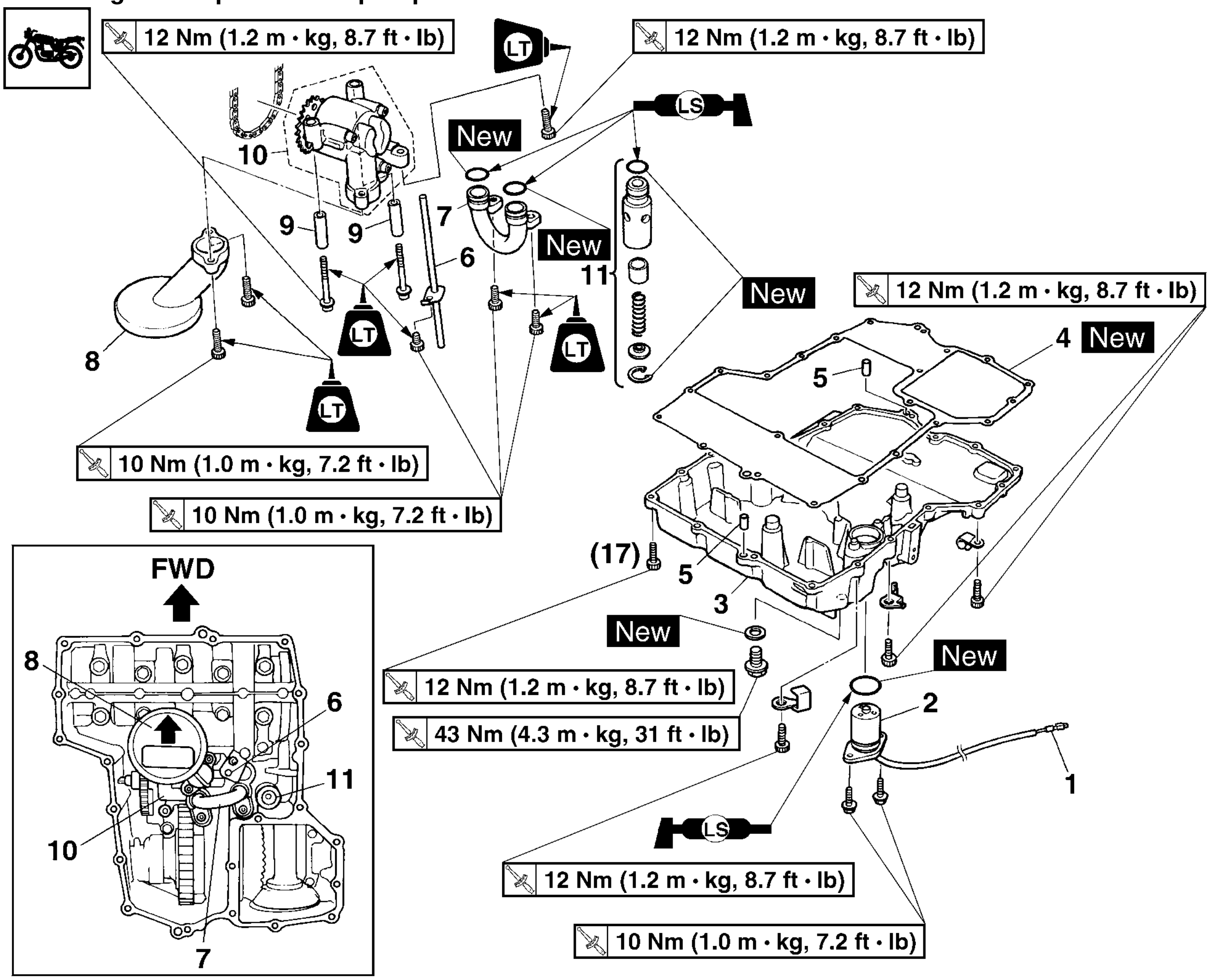
Align the punch mark “a” on the front shift arm with the punch mark “b” on the shift shaft.



EAS24920

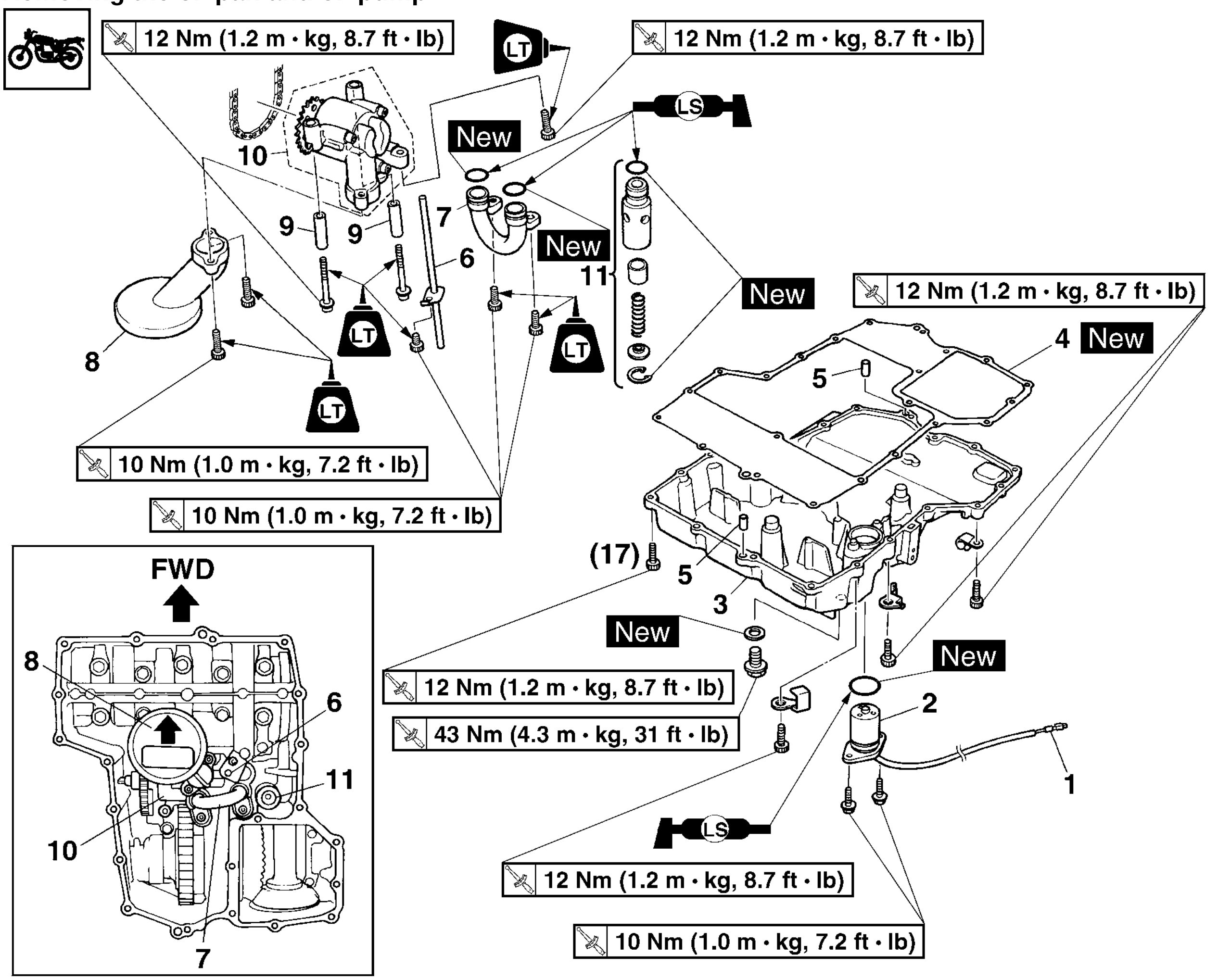
OIL PUMP

Removing the oil pan and oil pump



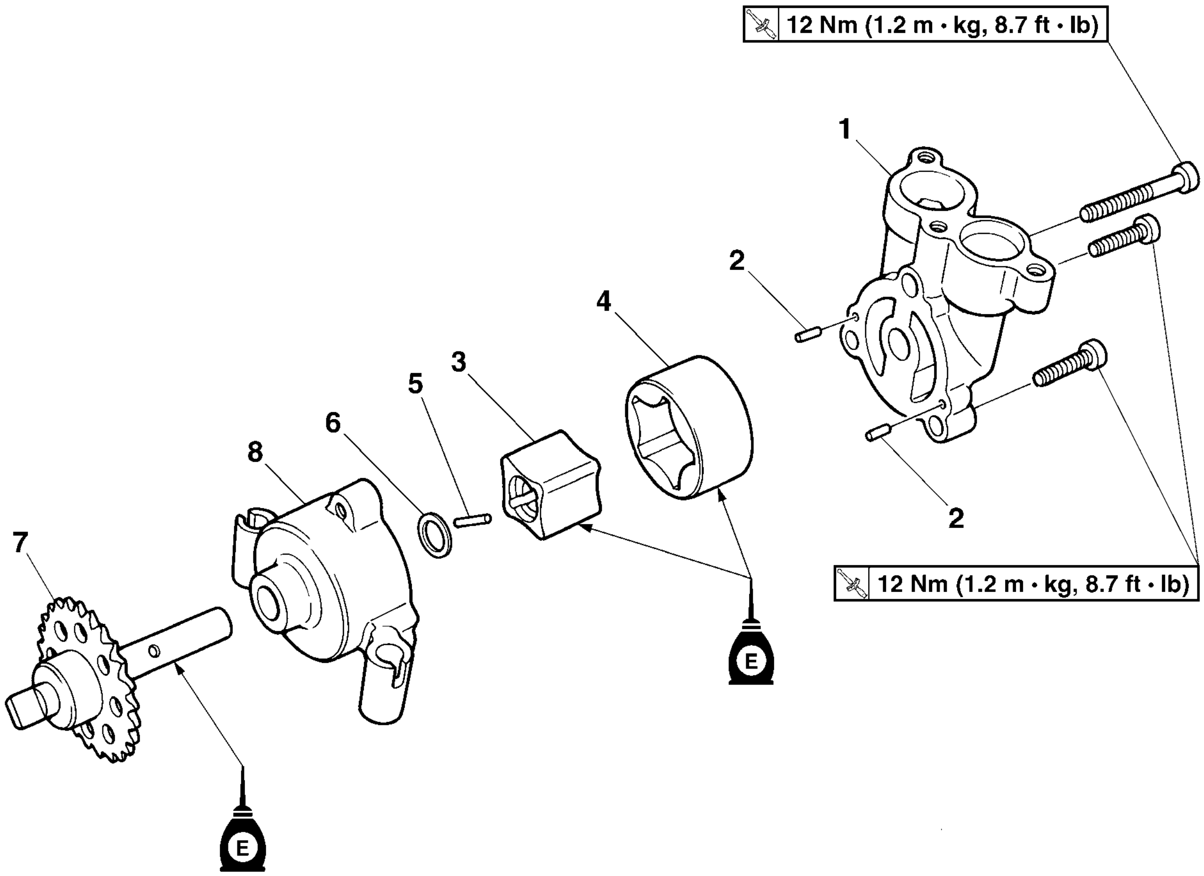
Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-15.
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-5.
	Exhaust pipe assembly		Refer to "ENGINE REMOVAL" on page 5-1.
	Sidestand		Refer to "SHAFT DRIVE" on page 4-101.
	Water pump		Refer to "WATER PUMP" on page 6-10.
1	Oil level switch coupler	1	Disconnect.
2	Oil level switch	1	
3	Oil pan	1	
4	Oil pan gasket	1	
5	Dowel pin	2	
6	Oil delivery pipe 2	1	
7	Oil delivery pipe 3	1	
8	Oil strainer	1	
9	Dowel pin	2	
10	Oil pump	1	

Removing the oil pan and oil pump



Order	Job/Parts to remove	Q'ty	Remarks
11	Relief valve assembly	1	
			For installation, reverse the removal procedure.

Disassembling the oil pump



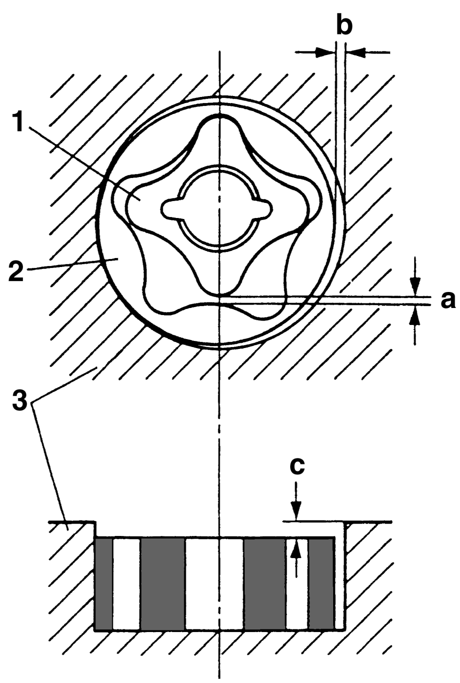
Order	Job/Parts to remove	Q'ty	Remarks
1	Oil pump housing cover	1	
2	Pin	2	
3	Oil pump inner rotor	1	
4	Oil pump outer rotor	1	
5	Pin	1	
6	Washer	1	
7	Oil pump driven sprocket	1	
8	Oil pump housing	1	
			For assembly, reverse the disassembly procedure.

EAS24960
CHECKING THE OIL PUMP

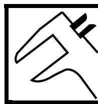
1. Check:
   - Oil pump driven sprocket
   - Oil pump housing
   - Oil pump housing cover

   Cracks/damage/wear → Replace the defective part(s).
2. Measure:
   - Inner-rotor-to-outer-rotor-tip clearance “a”
   - Outer-rotor-to-oil-pump-housing clearance “b”
   - Oil-pump-housing-to-inner-rotor-and-outer-rotor clearance “c”

   Out of specification → Replace the oil pump.



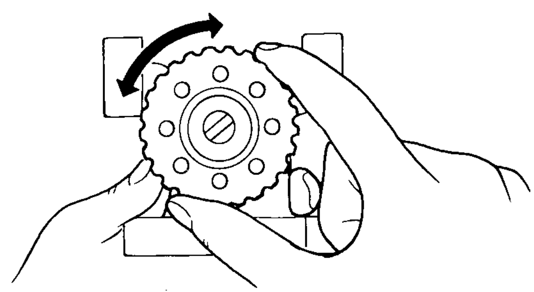
1. Inner rotor
2. Outer rotor
3. Oil pump housing



Inner-rotor-to-outer-rotor-tip clearance
Less than 0.12 mm (0.0047 in)
Limit
0.20 mm (0.0079 in)
Outer-rotor-to-oil-pump-housing clearance
0.090–0.150 mm (0.0035–0.0059 in)
Limit
0.220 mm (0.0087 in)
Oil-pump-housing-to-inner-and-outer-rotor clearance
0.03–0.08 mm (0.0012–0.0032 in)
Limit
0.15 mm (0.0059 in)

3. Check:
   - Oil pump operation

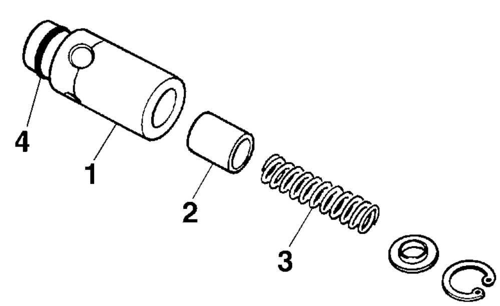
   Rough movement → Repeat steps (1) and (2) or replace the defective part(s).



EAS24970
CHECKING THE RELIEF VALVE

1. Check:
   - Relief valve body “1”
   - Relief valve “2”
   - Spring “3”
   - O-ring “4”

   Damage/wear → Replace the defective part(s).



EAS24980
CHECKING THE OIL DELIVERY PIPES

The following procedure applies to all of the oil delivery pipes.

1. Check:
   - Oil delivery pipes
     Damage → Replace.
     Obstruction → Wash and blow out with compressed air.

EAS24990
CHECKING THE OIL STRAINER

1. Check:
   - Oil strainer
     Damage → Replace.
     Contaminants → Clean with solvent.

EAS25010
ASSEMBLING THE OIL PUMP

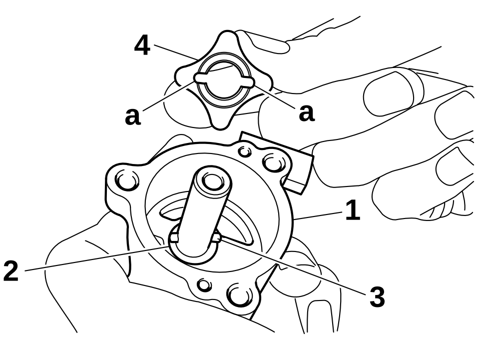
1. Lubricate:
   - Inner rotor
   - Outer rotor
   - Oil pump shaft
     (with the recommended lubricant)

	Recommended lubricant **Engine oil**

2. Install:
   - Oil pump driven sprocket
   - Oil pump housing “1”
   - Washer “2”
   - Pin “3”
   - Oil pump inner rotor “4”
   - Oil pump outer rotor

TIP

When installing the inner rotor, align the pin “3” in the oil pump shaft with the groove “a” in the inner rotor “4”.



3. Check:
   - Oil pump operation
     Refer to “CHECKING THE OIL PUMP” on page 5-85.

EAS25050
INSTALLING THE OIL PAN

1. Install:
   - Oil pan gasket New
   - Oil pan

	Oil pan bolt **12 Nm (1.2 m·kg, 8.7 ft·lb)**

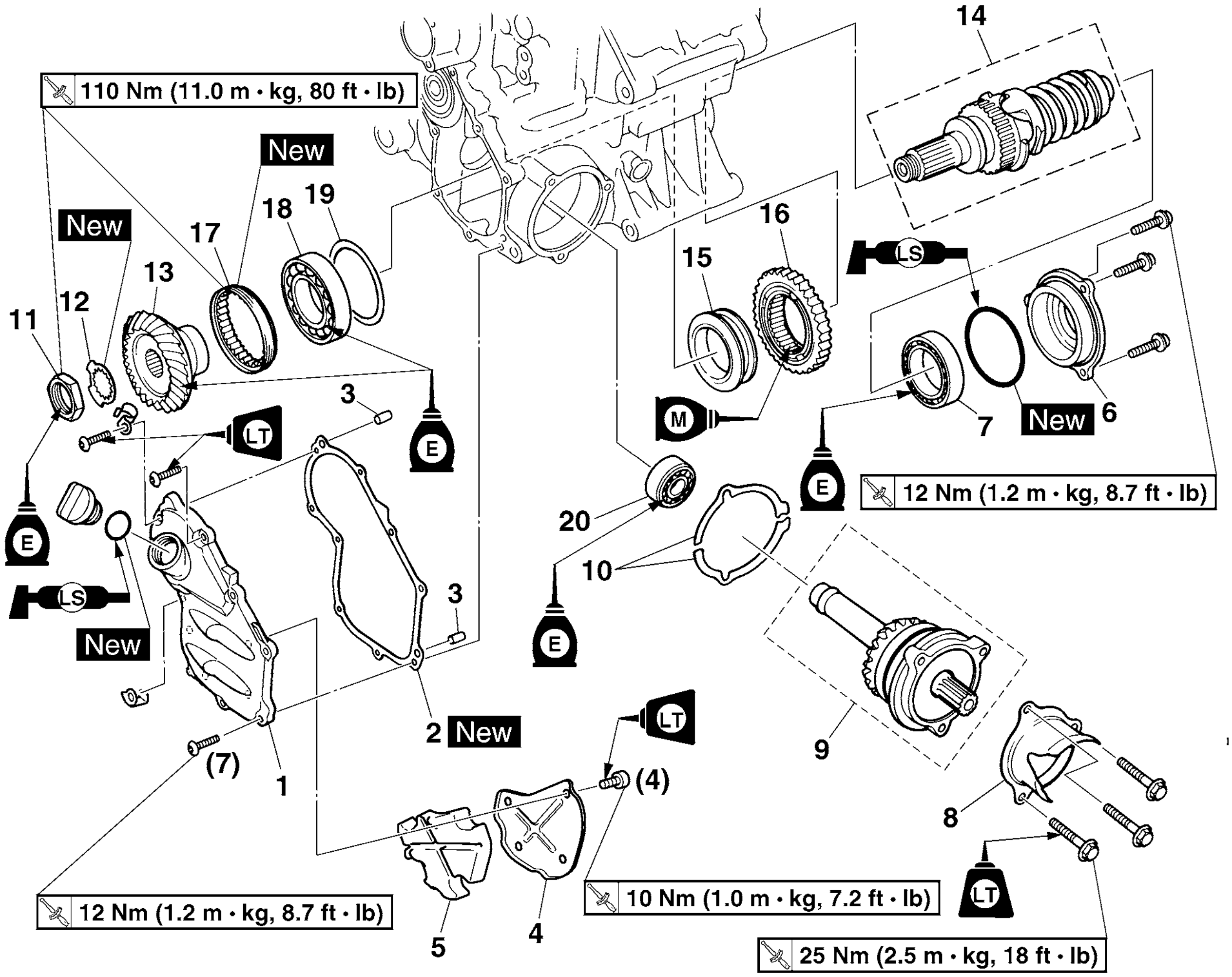
TIP

Tighten the oil pan bolts in stages and in a crisscross pattern.

EAS25710

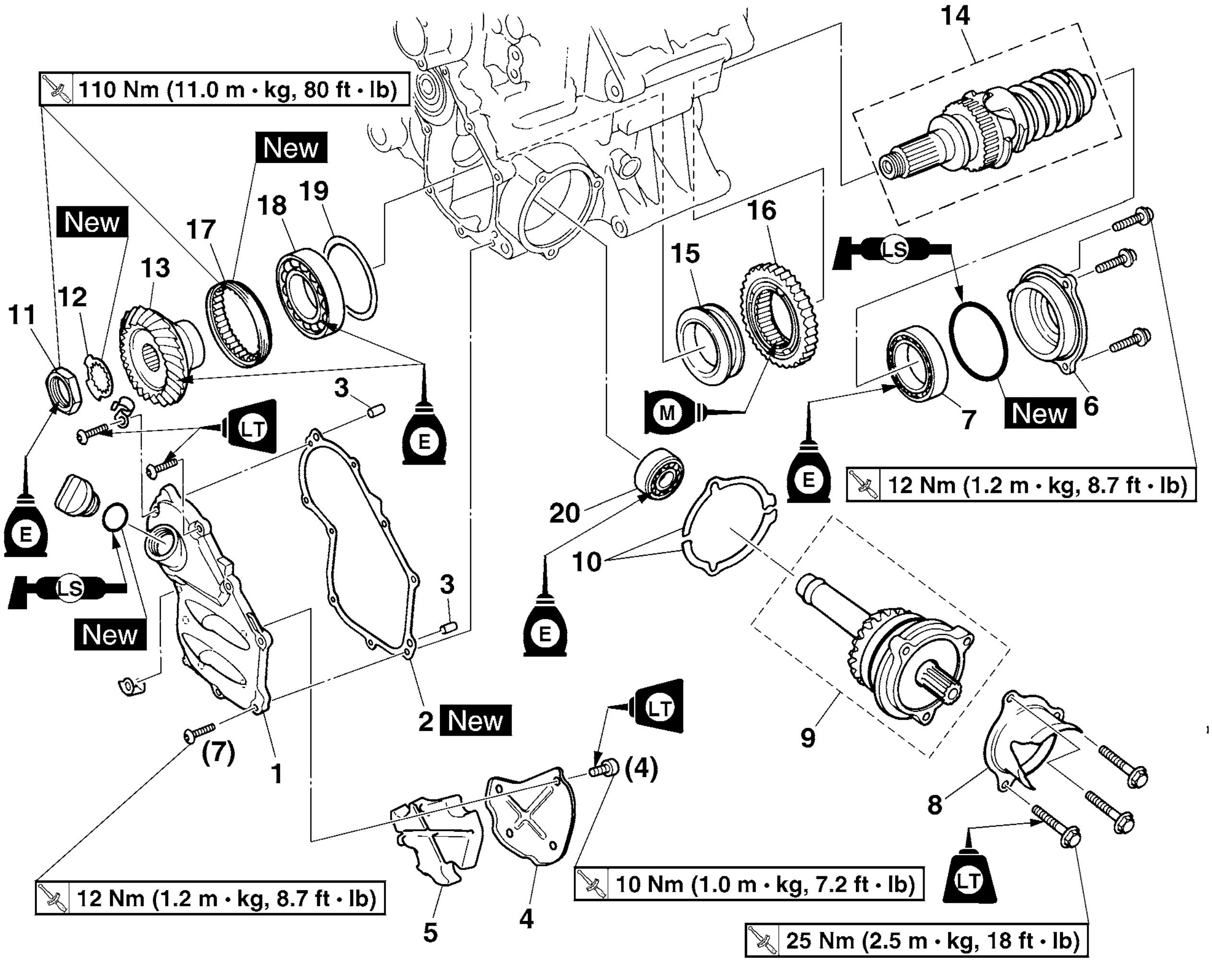
MIDDLE GEAR

Removing the middle gear (FJR13A)



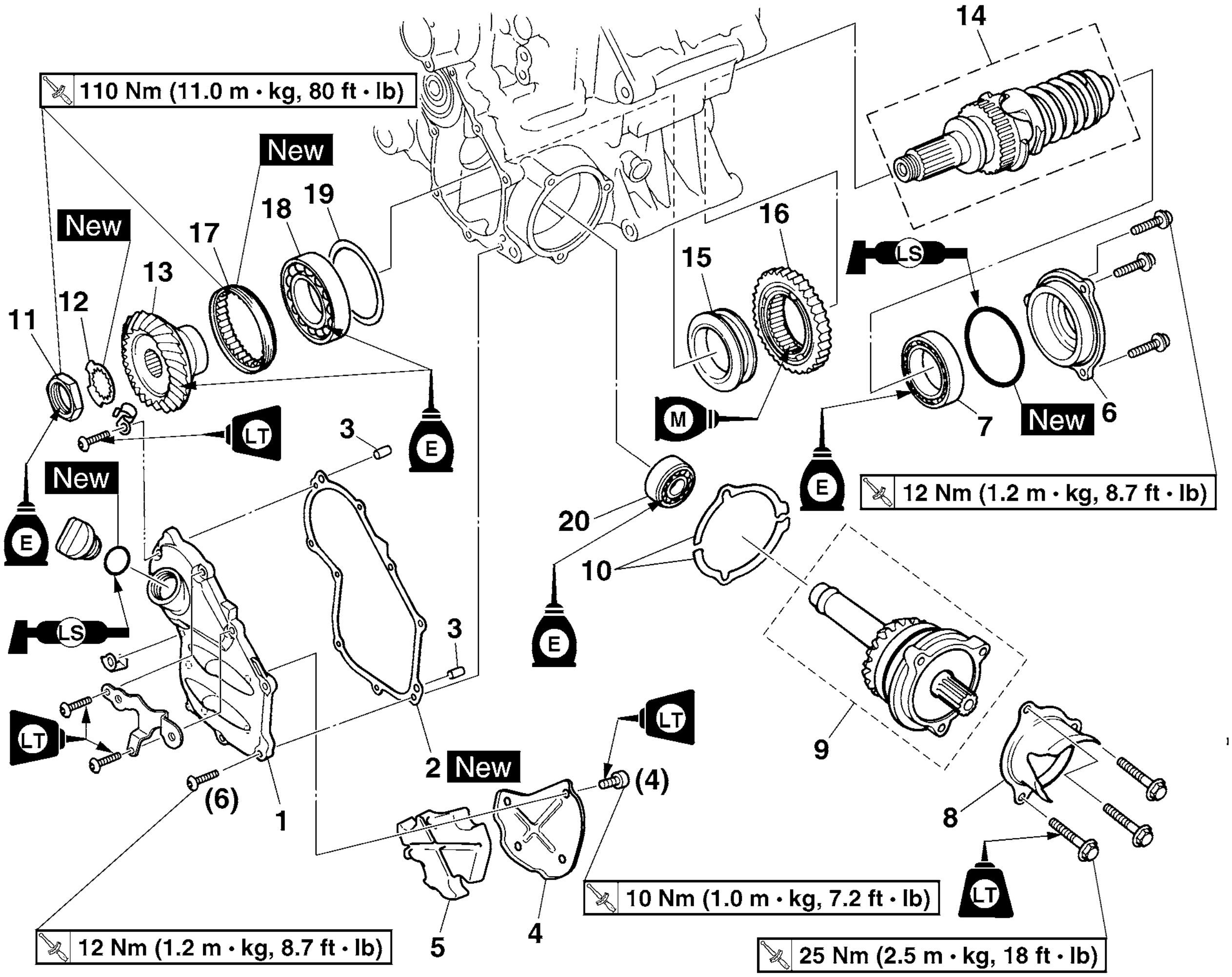
Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-1.
	Oil pan/Oil pump		Refer to "OIL PUMP" on page 5-82.
1	Middle gear case cover	1	
2	Middle gear case cover gasket	1	
3	Dowel pin	2	
4	Damper cover	1	
5	Damper	1	
6	Middle drive shaft bearing housing	1	
7	Bearing	1	
8	Middle driven shaft end cover	1	
9	Middle driven shaft assembly	1	
10	Middle driven pinion gear shim		
11	Middle drive pinion gear nut	1	
12	Lock washer	1	
13	Middle drive pinion gear	1	
14	Middle drive shaft assembly	1	

Removing the middle gear (FJR13A)



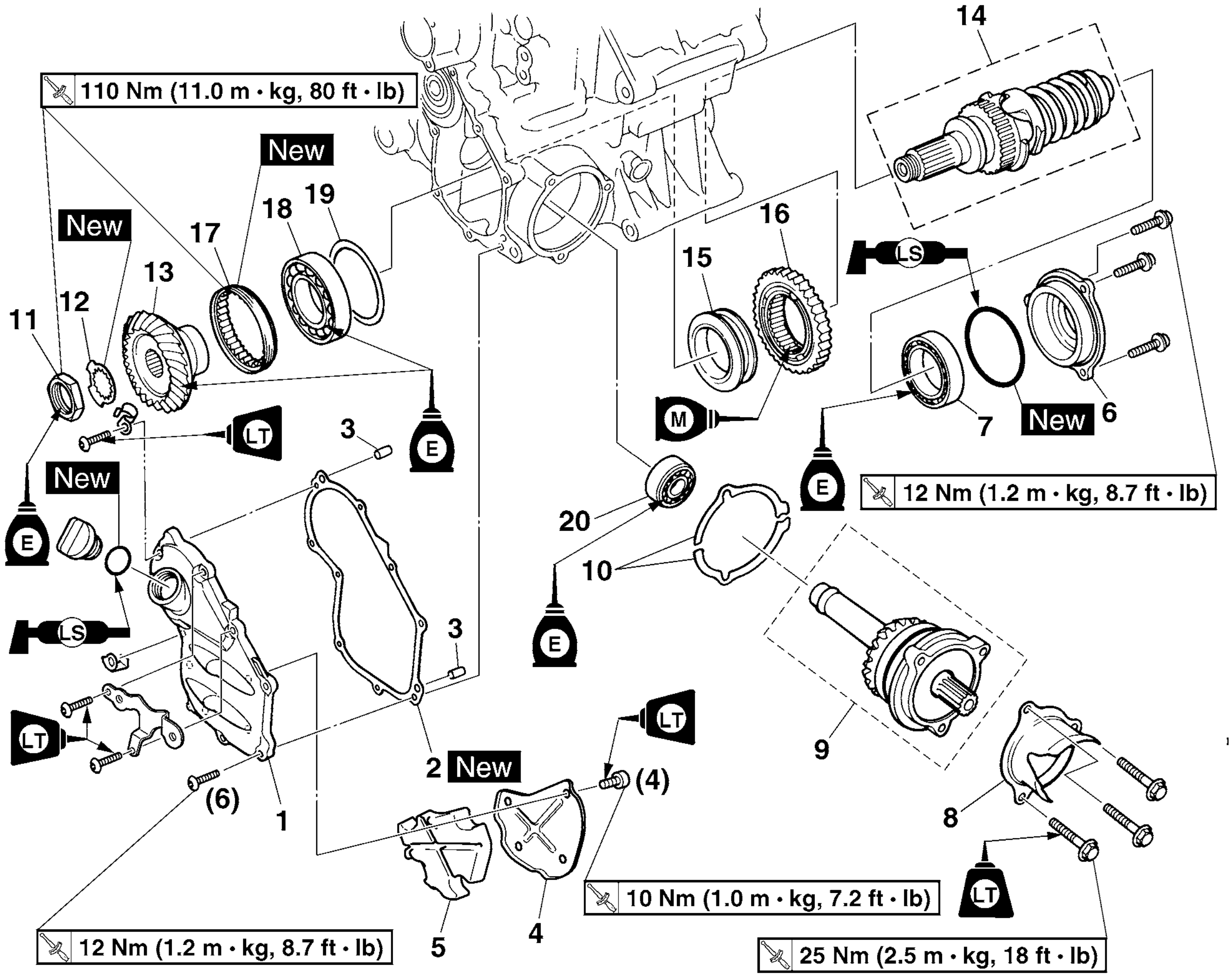
Order	Job/Parts to remove	Q'ty	Remarks
15	Spacer	1	
16	Middle driven gear	1	
17	Bearing retainer	1	
18	Bearing	1	
19	Middle drive pinion gear shim		
20	Bearing	1	
			For installation, reverse the removal procedure.

Removing the middle gear (FJR13AE)



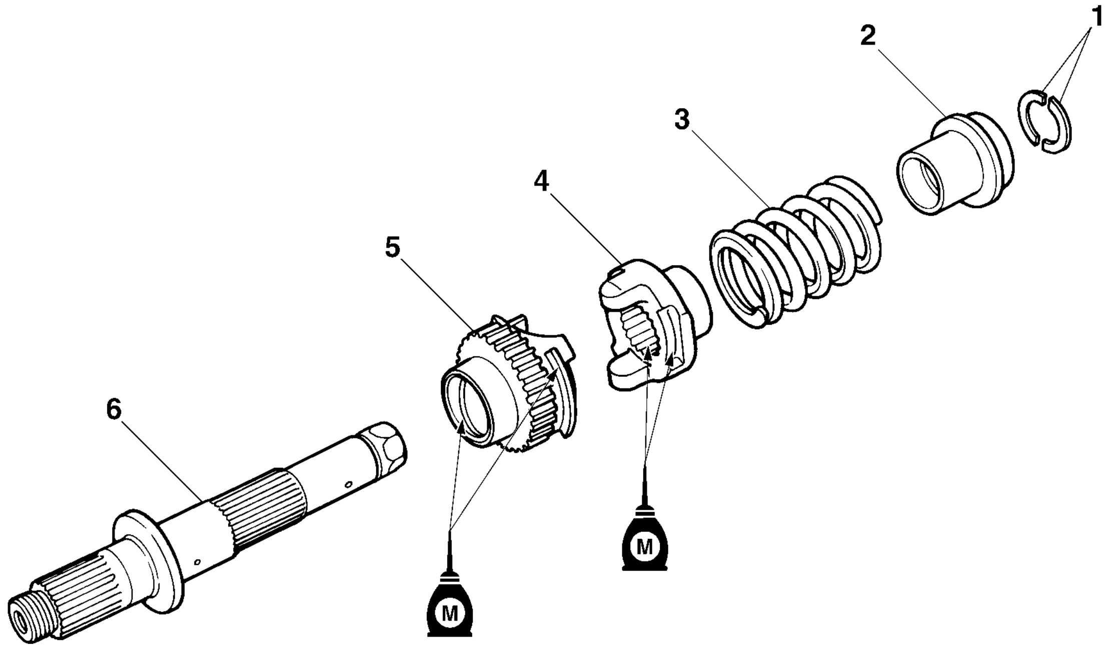
Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-1.
	Oil pan/Oil pump		Refer to "OIL PUMP" on page 5-82.
1	Middle gear case cover	1	
2	Middle gear case cover gasket	1	
3	Dowel pin	2	
4	Damper cover	1	
5	Damper	1	
6	Middle drive shaft bearing housing	1	
7	Bearing	1	
8	Middle driven shaft end cover	1	
9	Middle driven shaft assembly	1	
10	Middle driven pinion gear shim		
11	Middle drive pinion gear nut	1	
12	Lock washer	1	
13	Middle drive pinion gear	1	
14	Middle drive shaft assembly	1	
15	Spacer	1	

Removing the middle gear (FJR13AE)



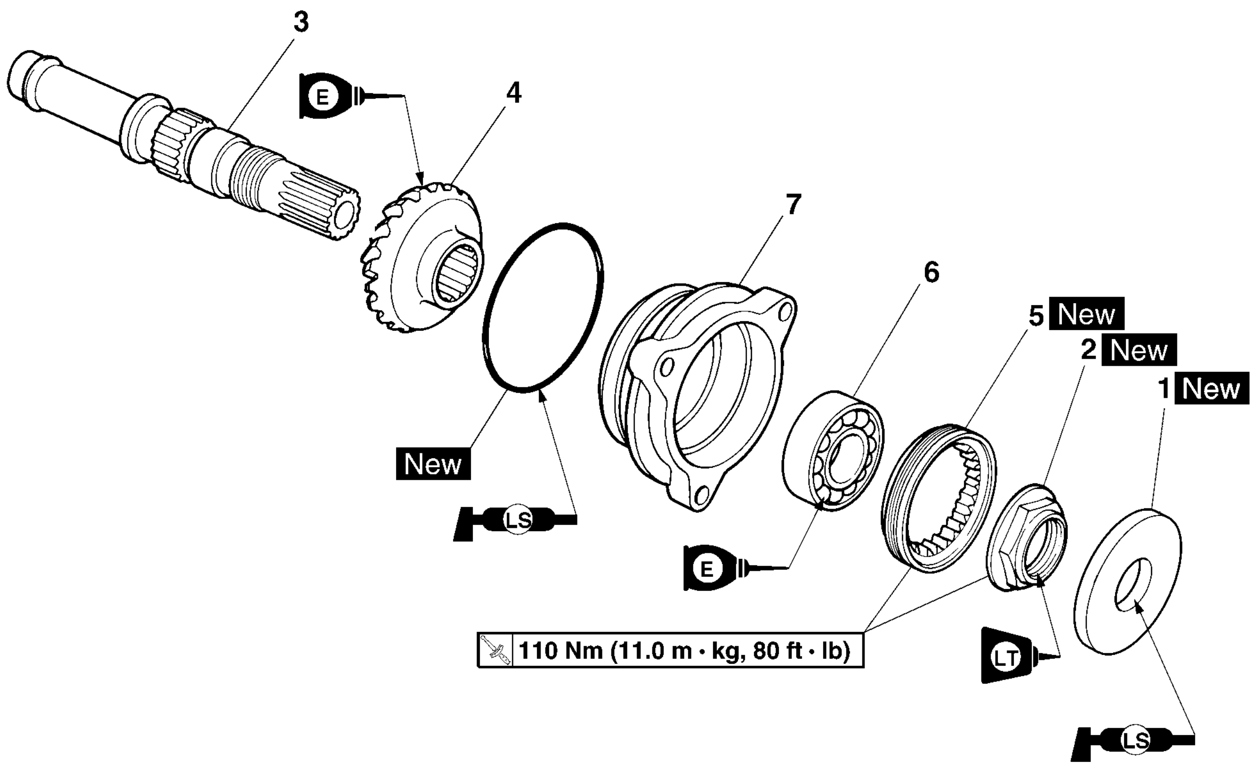
Order	Job/Parts to remove	Q'ty	Remarks
16	Middle driven gear	1	
17	Bearing retainer	1	
18	Bearing	1	
19	Middle drive pinion gear shim		
20	Bearing	1	
			For installation, reverse the removal procedure.

Disassembling the middle drive shaft assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	Spring retainer	2	
2	Spring seat	1	
3	Damper spring	1	
4	Damper driven cam	1	
5	Damper drive cam	1	
6	Middle drive shaft	1	
			For assembly, reverse the disassembly procedure.

Disassembling the middle driven shaft assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	Oil seal	1	
2	Middle driven pinion gear nut	1	
3	Middle driven shaft	1	
4	Middle driven pinion gear	1	
5	Bearing retainer	1	
6	Bearing	1	
7	Middle driven shaft bearing housing	1	
			For assembly, reverse the disassembly procedure.

EAS25730
REMOVING THE MIDDLE DRIVE SHAFT ASSEMBLY

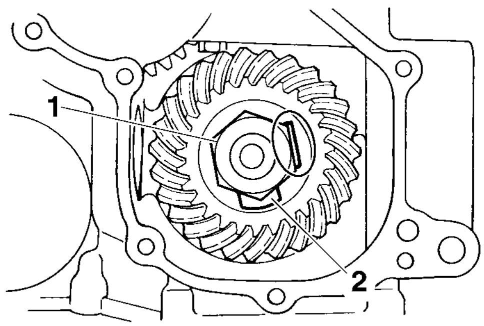
1. Remove:
   - Middle drive pinion gear nut “1”
   - Lock washer “2”

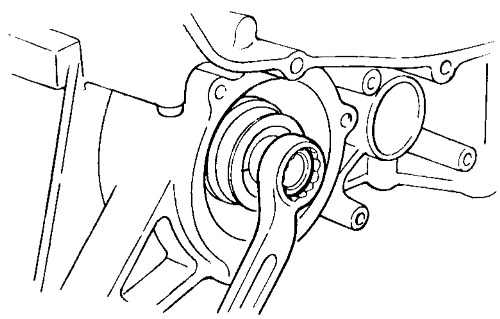
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a. Straighten the lock washer tab.
b. Loosen the middle drive pinion gear nut.

TIP

While holding the middle drive shaft.





c. Remove the middle drive pinion gear nut and lock washer.

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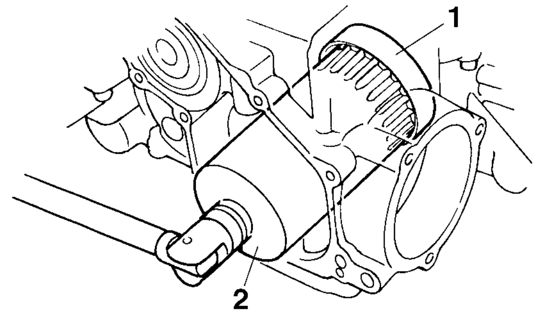
2. Remove:
   - Bearing retainer “1”

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a. Straighten the thread on the bearing retainer.
b. Attach the bearing retainer wrench “2”.

	Bearing retainer wrench **90890-04137** **Middle drive shaft bearing retainer wrench** **YM-04137**

c. Loosen the bearing retainer.



d. Remove the bearing retainer.

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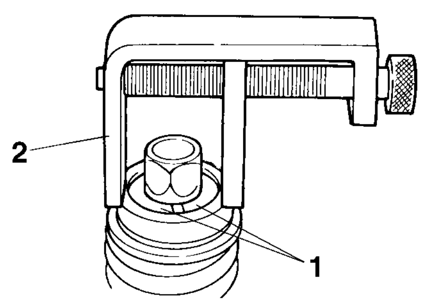
EAS25750
DISASSEMBLING THE MIDDLE DRIVE SHAFT ASSEMBLY

1. Remove:
   - Spring retainers “1”

TIP

While compressing the spring with the damper spring compressor “2”, remove the spring retainers.

	Damper spring compressor **90890-04090**



EAS25770
DISASSEMBLING THE MIDDLE DRIVEN SHAFT ASSEMBLY

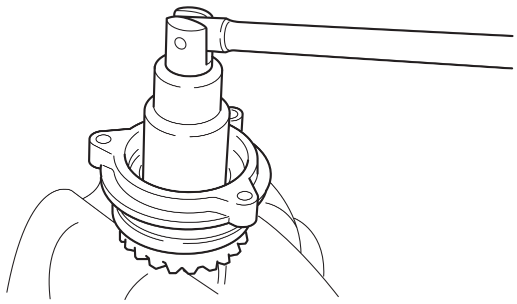
1. Remove:
   - Middle driven pinion gear nut

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a. Straighten the thread on the middle driven pinion gear nut.
b. Loosen the middle driven pinion gear nut.

TIP

Secure the middle driven shaft in a vise, making sure to tighten the vise jaws onto the flat sections of the shaft.



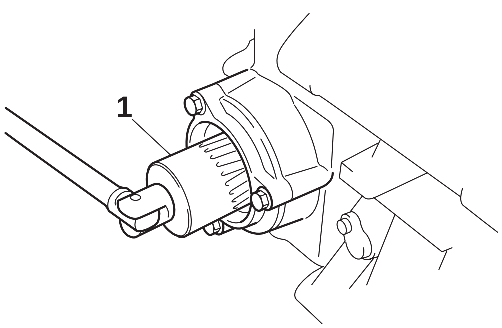
c. Remove the middle driven pinion gear nut.

2. Remove:
   - Bearing retainer

a. Temporarily install the middle driven shaft bearing housing onto the lower crankcase.
b. Straighten the thread on the bearing retainer.
c. Attach the bearing retainer wrench “1”.

Bearing retainer wrench
90890-04140
Middle drive shaft bearing retainer wrench
YM-04140

d. Loosen the bearing retainer.



e. Remove the bearing retainer.

EAS25780

CHECKING THE MIDDLE DRIVE SHAFT ASSEMBLY

1. Check:
   - Middle drive pinion gear
     Galling/pitting/wear → Replace.
2. Check:
   - Damper drive cam surface
   - Damper driven cam surface
     Scratches/wear → Replace.
3. Check:
   - Damper spring
     Cracks/damage → Replace.
4. Check:
   - Bearings
     Damage/pitting → Replace.

EAS25790

CHECKING THE MIDDLE DRIVEN SHAFT ASSEMBLY

1. Check:
   - Middle driven pinion gear
     Galling/pitting/wear → Replace.
2. Check:
   - Bearings
     Damage/pitting → Replace.

EAS25800

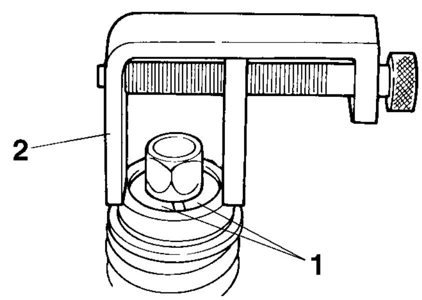
ASSEMBLING THE MIDDLE DRIVE SHAFT ASSEMBLY

1. Install:
   - Spring retainers “1”

TIP

While compressing the spring with the damper spring compressor “2”, install the spring retainers.

Damper spring compressor
90890-04090



EAS25820

ASSEMBLING THE MIDDLE DRIVEN SHAFT ASSEMBLY

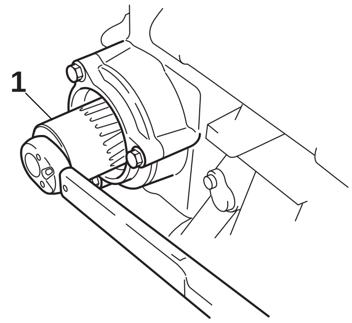
1. Tighten:
   - Bearing retainer New

a. Temporarily install the middle driven shaft bearing housing onto the lower crankcase.
b. Attach the bearing retainer wrench “1”.

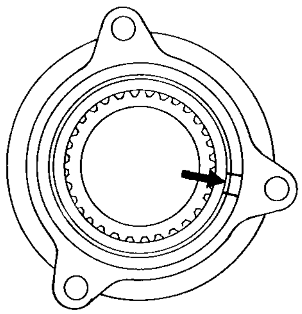
Bearing retainer wrench
90890-04140
Middle drive shaft bearing retainer wrench
YM-04140

c. Tighten the bearing retainer to specification.

	Bearing retainer **110 Nm (11.0 m·kg, 80 ft·lb)**



d. Lock the threads with a drift punch.



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2. Tighten:
   - Middle driven pinion gear nut New

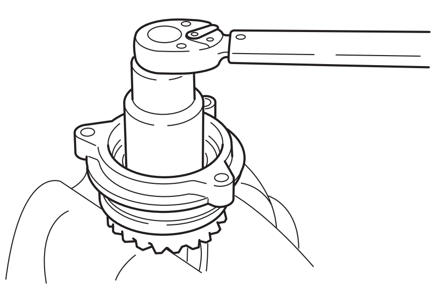
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a. Tighten the middle driven pinion gear nut to specification.

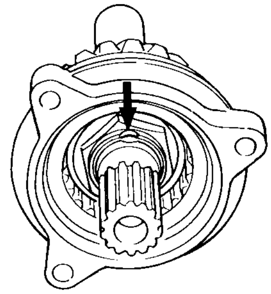
	Middle driven pinion gear nut **110 Nm (11.0 m·kg, 80 ft·lb)** **LOCTITE®**

TIP

Secure the middle driven shaft in a vise, making sure to tighten the vise jaws onto the flat sections of the shaft.



b. Lock the threads with a drift punch.



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EAS25860

INSTALLING THE MIDDLE DRIVE SHAFT ASSEMBLY

1. Tighten:
   - Bearing retainer “1” New

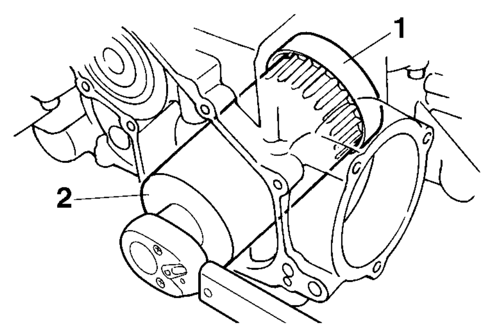
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a. Attach the bearing retainer wrench “2”.

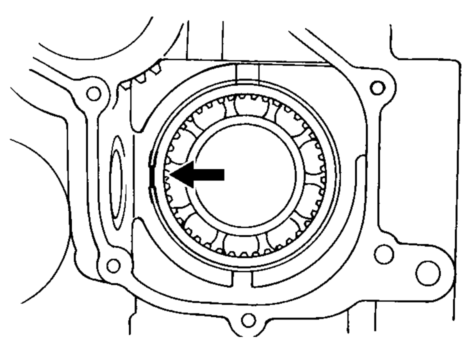
	Bearing retainer wrench **90890-04137** **Middle drive shaft bearing retainer wrench** **YM-04137**

b. Tighten the bearing retainer to specification.

	Bearing retainer **110 Nm (11.0 m·kg, 80 ft·lb)**



c. Lock the threads with a drift punch.



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2. Install:
   - Lock washer “1” New

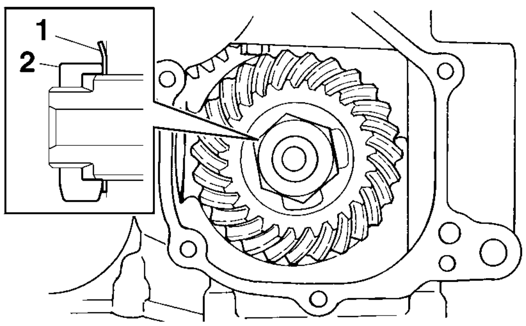
- Middle drive pinion gear nut “2”

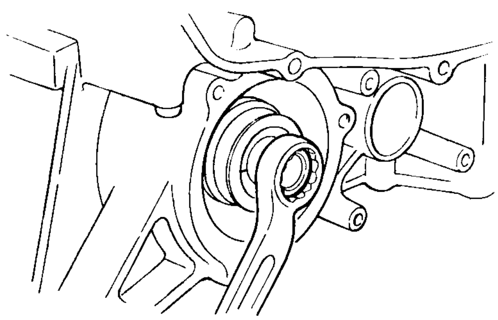
a. Tighten the middle drive pinion gear nut to specification.

	Middle drive pinion gear nut **110 Nm (11.0 m·kg, 80 ft·lb)**

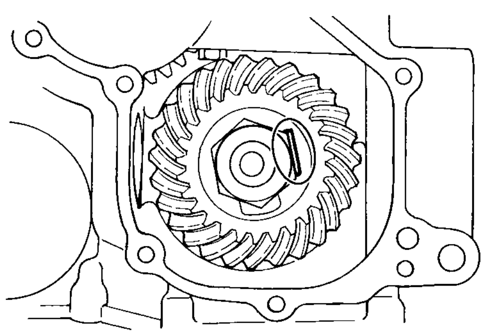
TIP

- Lubricate the nut threads with engine oil.
- Install the middle drive pinion gear nut with its large inner diameter side facing inward as shown in the illustration.
- While holding the middle drive shaft.





b. Bend the lock washer tab along a flat side of the nut.



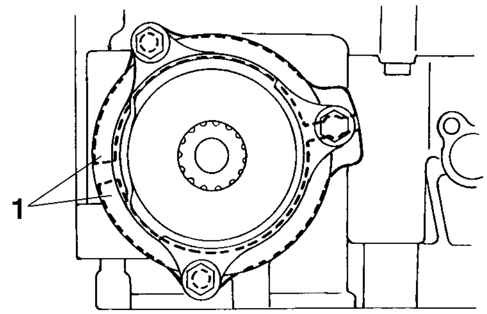
EAS25870

INSTALLING THE MIDDLE DRIVEN SHAFT ASSEMBLY

1. Install:
   - Middle driven shaft assembly
   - Middle driven pinion gear shims “1”
   - Middle driven shaft end cover
   - Middle driven shaft bearing housing bolts

TIP

Finger tighten the middle driven shaft bearing housing bolts.



2. Tighten:
   - Middle driven shaft bearing housing bolts

	Middle driven shaft bearing housing bolt **25 Nm (2.5 m·kg, 18 ft·lb)** **LOCTITE®**

TIP

Before tightening the bolts:
1. Adjust the middle gear backlash.
   Refer to “ADJUSTING THE MIDDLE GEAR BACKLASH” on page 5-97.
2. Check that the middle gears turns smoothly.

ET3P61025

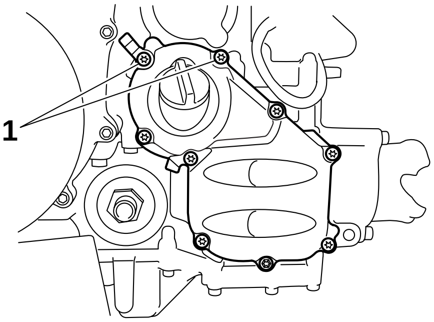
INSTALLING THE MIDDLE GEAR CASE COVER

1. Install:
   - Middle gear case cover
   - Middle gear case cover bolts

TIP

Apply locking agent (LOCTITE®) to the threads of the bolts “1”.

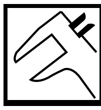
	Middle gear case cover bolt **12 Nm (1.2 m·kg, 8.7 ft·lb)**



EAS25880

MEASURING THE MIDDLE GEAR BACKLASH

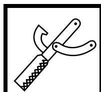
1. Measure:
   - Middle gear backlash
     Out of specification → Refer to "ADJUSTING THE MIDDLE GEAR BACKLASH" on page 5-97.



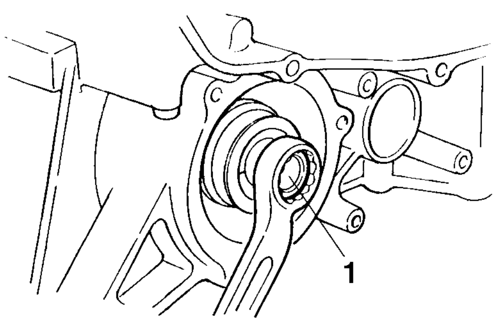
Middle gear backlash
0.10–0.20 mm (0.0039–0.0079 in)

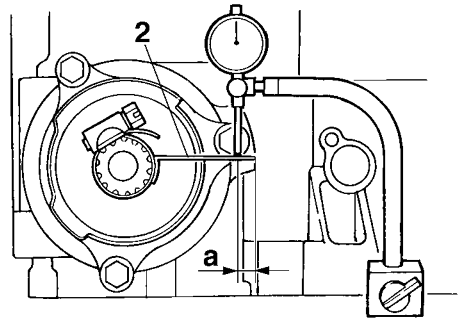
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a. Hold the middle drive shaft "1".
b. Install the gear lash measurement tool "2" as shown.
c. Make sure the dial gauge plunger contacts the measuring point "a" on the gear lash measurement tool as shown.



Gear lash measurement tool
90890-01467
YM-01467





a. 14 mm (0.55 in)

d. While gently turning the middle driven shaft back and forth, measure the middle gear backlash.

TIP

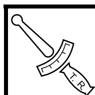
Measure the middle gear backlash at four positions. Rotate the middle driven shaft 90° each time and observe the reading on the dial gauge.

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EAS25900

ADJUSTING THE MIDDLE GEAR BACKLASH

1. Loosen:
   - Middle driven shaft bearing housing bolts
2. Remove:
   - Middle driven pinion gear shim(s)
3. Tighten:
   - Middle driven shaft bearing housing bolts



Middle driven shaft bearing housing bolt
25 Nm (2.5 m·kg, 18 ft·lb)

ECA14050

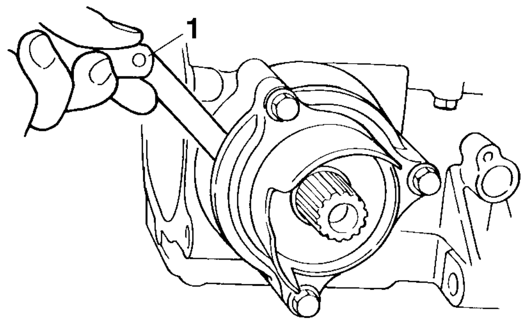
NOTICE

Do not overtighten the middle driven shaft bearing housing bolts or you may obtain too little middle gear backlash and damage the middle gears. If the bolts are overtightened, loosen them until the crankcase-to-middle-driven-shaft-bearing-housing clearance is within specification, as stated below. Then, repeat all of the previous steps.

TIP

- Tighten the middle driven shaft bearing housing bolts carefully, one thread turn at a time only. Push in the middle driven shaft bearing housing and then tighten the bolts to specification.

- After tightening the middle driven shaft bearing housing bolts, loosen them until the clearance between the crankcase and the housing is approximately 2 mm (0.08 in), when measured with a thickness gauge “1”.

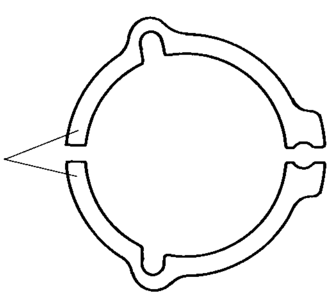


4. Hold the middle drive shaft.
5. Turn:
   - Middle driven shaft

TIP

While carefully tightening the middle driven shaft bearing housing bolts in stages and in a crisscross pattern, turn the middle driven shaft back and forth until the dial gauge reads 0.10–0.20 mm (0.0039–0.0079 in).

6. Measure:
   - Crankcase-to-middle-driven-shaft-bearing-housing clearance
     (with a thickness gauge)
7. Select:
   - Middle driven pinion gear shim(s) “1”



a. Shims can only be selected in 0.05 mm increments, therefore round off to the hundredth’s digit of the calculated thickness and select the appropriate shims with the following chart.
b. For example, the clearance between the crankcase and the middle driven shaft bearing housing is 0.42 mm. Therefore, the chart instructs you to round off the 2 to 0. Thus, you should use one 0.40 mm shim.

Hundredth	Rounded value
0, 1, 2	0
3, 4, 5, 6, 7	5
8, 9	10

Shims are supplied in the following thicknesses.

Middle driven pinion gear shim
Thickness (mm)
0.10 0.15 0.20 0.30 0.40 0.50

8. Loosen:
   - Middle driven shaft bearing housing bolts
9. Install:
   - Middle driven pinion gear shim(s)
10. Tighten:
   - Middle driven shaft bearing housing bolts

Middle driven shaft bearing housing bolt
25 Nm (2.5 m·kg, 18 ft·lb)
LOCTITE®

11. Measure:
   - Middle gear backlash
     Out of specification → Refer to “MEASURING THE MIDDLE GEAR BACKLASH” on page 5-97.

EAS25930

ALIGNING THE MIDDLE GEAR

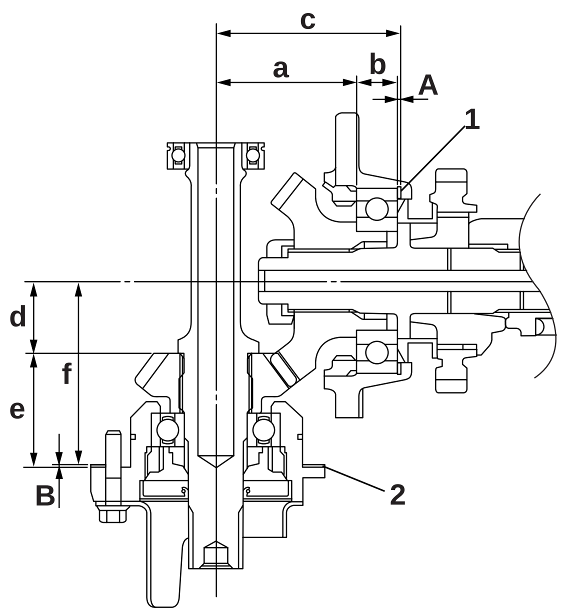
TIP

Aligning the middle gear is necessary when any of the following parts are replaced:
- Crankcase
- Middle drive shaft
- Middle driven shaft bearing housing

1. Select:
   - Middle drive pinion gear shim(s) “1”
   - Middle driven pinion gear shim(s) “2”

TIP

Select the middle driven gear shim(s) “2” by calculating the middle drive gear shim thickness and then measuring the middle gear backlash.



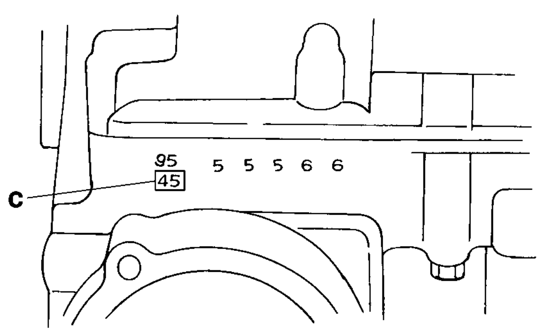
A. Middle drive pinion gear shim thickness
B. Middle driven pinion gear shim thickness

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a. Position the middle gears with the appropriate shim(s) that has had its respective thickness calculated from information marked on the crankcase and middle driven pinion gear.
b. To find middle drive pinion gear shim thickness "A", use the following formula.

Middle drive pinion gear shim thickness "A" = "c" - "a" - "b"

"a"= 65.00
"b"= 18.94
"c"= a numeral on the lower crankcase, to be divided by 100 and added to "84"



Example:
"a" is 65.00
"b" is 18.94
If the lower crankcase is marked "45"
"c" is 84.45 (i.e., 84.00 + 0.45 = 84.45)
"A" = 84.45 - 65.00 - 18.94 = 0.51

Round off to the hundredths digit and select the appropriate shim(s).

TIP

In the above example, the calculated number is 0.51. The chart instructs you to round off the 1 to 0. Thus, the shim thickness is 0.50 mm.

Hundredth	Rounded value
0, 1, 2	0
3, 4, 5, 6, 7	5
8, 9	10

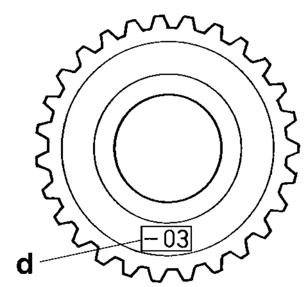
Shims are supplied in the following thicknesses.

Middle drive pinion gear shim **Thickness (mm)** **0.15 0.30 0.50**

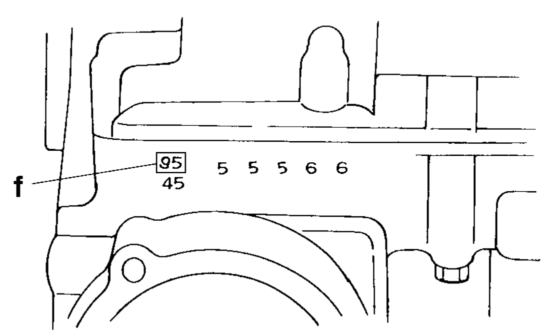
c. To find middle driven pinion gear shim thickness "B", use the following formula.

Middle driven pinion gear shim thickness "B" = "d" + "e" - "f"

"d" = a numeral on the middle driven pinion gear, to be divided by 100 and either added to or subtracted from "34"



"e" = Measured value
"f" = a numeral on the lower crankcase, to be divided by 100 and added to "87".



Example:
If the middle driven pinion gear is marked "-03"

"d" is 33.97 (i.e., 34.00 + (- 0.03) = 33.97)
"e" is 54.49
If the lower crankcase is marked "95"
"f" is 87.95 (i.e., 87.00 + 0.95 = 87.95)
"B" = 33.97 + 54.49 - 87.95 = 0.51
Round off to the hundredths digit and select the appropriate shim(s).

TIP

In the above example, the calculated number is 0.51. The chart instructs you to round off the 1 to 0. Thus, the shim thickness is 0.50 mm.

Hundredth	Rounded value
0, 1, 2	0
3, 4, 5, 6, 7	5
8, 9	10

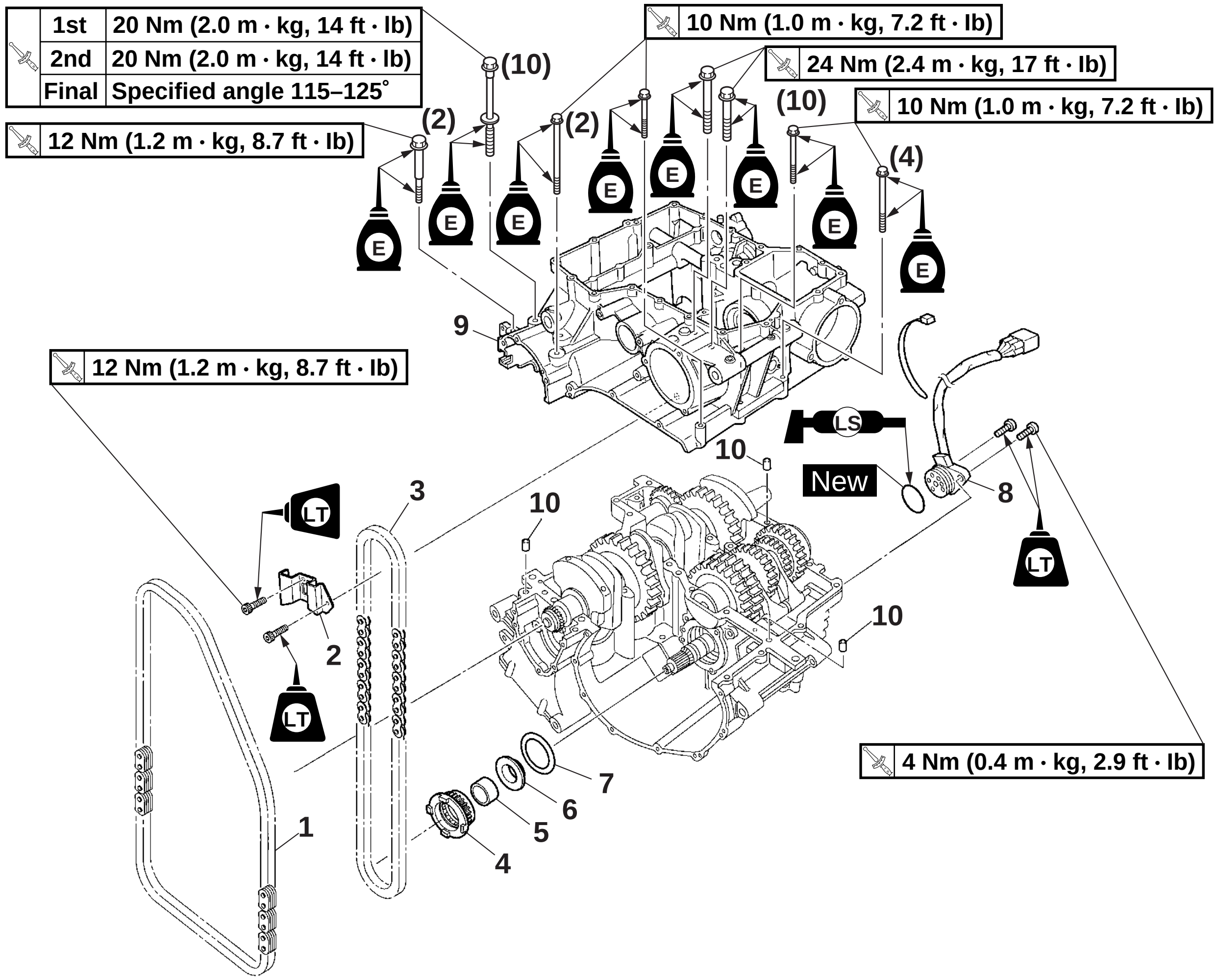
Shims are supplied in the following thicknesses.

Middle driven pinion gear shim
Thickness (mm)
0.10 0.15 0.20 0.30 0.40 0.50

EAS25540

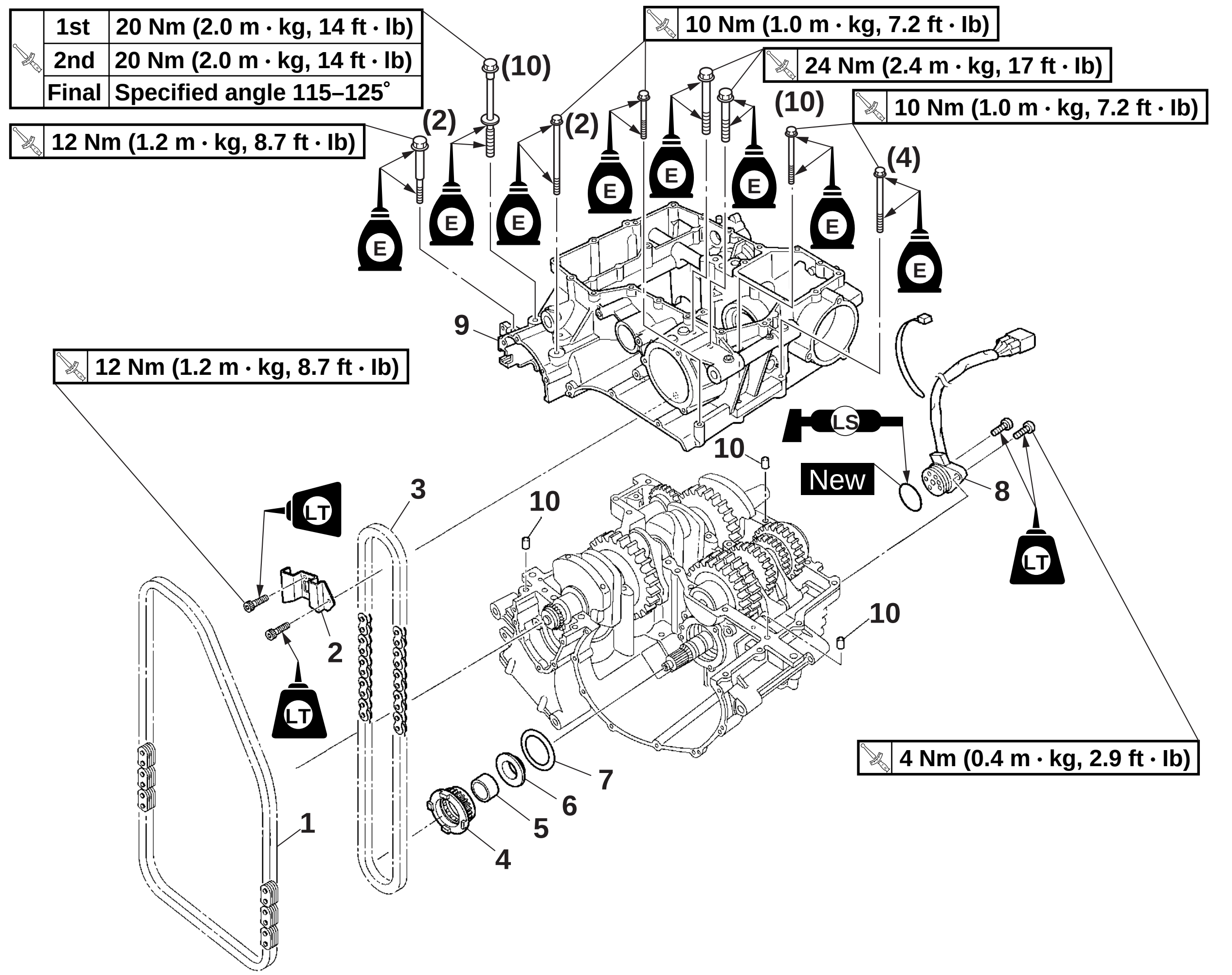
CRANKCASE

Separating the crankcase (FJR13A)



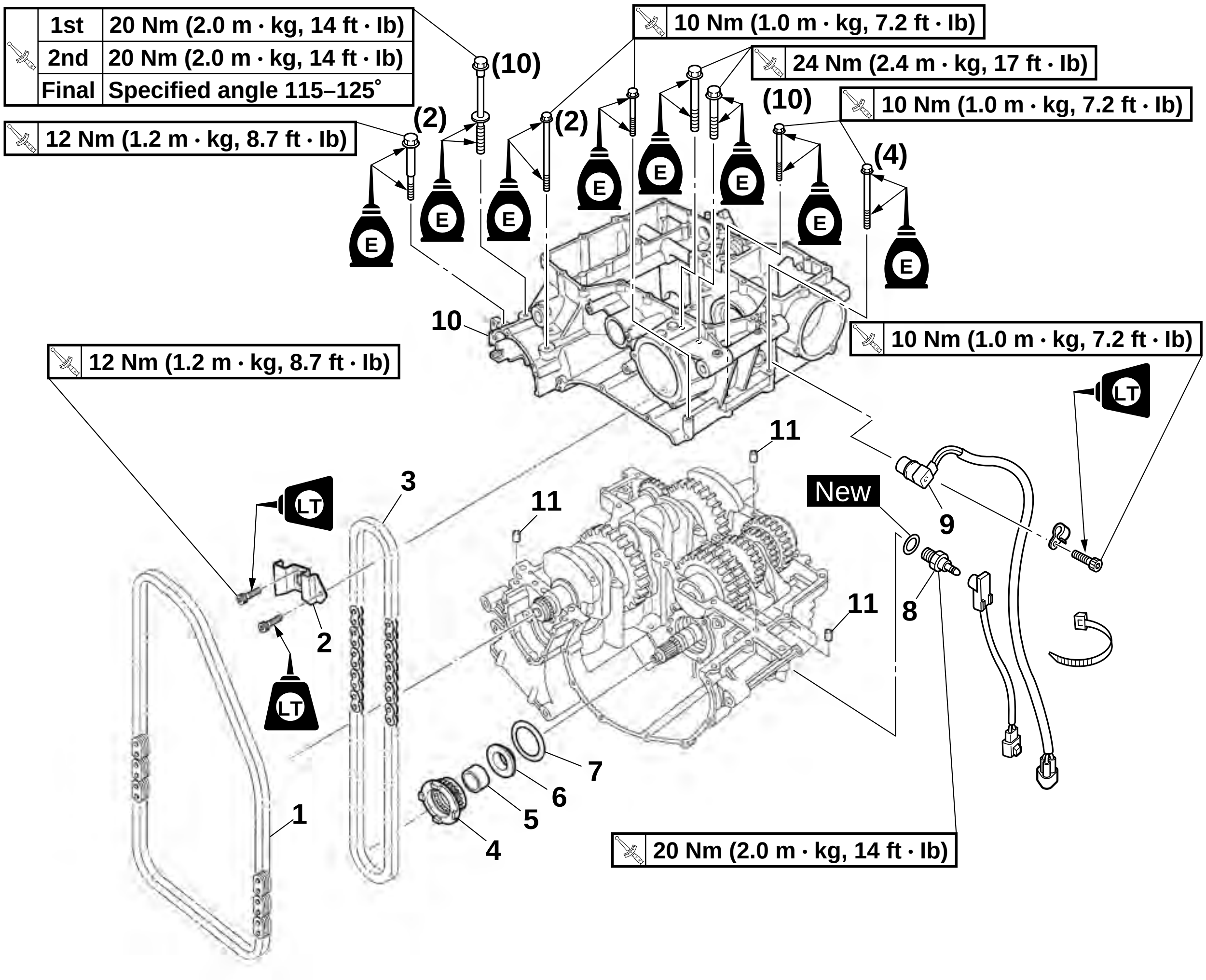
Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-1.
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-22.
	Starter clutch		Refer to "GENERATOR AND STARTER CLUTCH" on page 5-33.
	Pickup rotor		Refer to "PICKUP ROTOR" on page 5-39.
	Oil pump		Refer to "OIL PUMP" on page 5-82.
	Middle drive shaft assembly		Refer to "MIDDLE GEAR" on page 5-87.
	Clutch housing		Refer to "CLUTCH" on page 5-46.
1	Timing chain	1	
2	Oil pump drive chain guide	1	
3	Oil pump drive chain	1	
4	Oil pump drive sprocket	1	
5	Spacer	1	
6	Collar	1	
7	Spring washer	1	
8	Gear position switch	1	

Separating the crankcase (FJR13A)



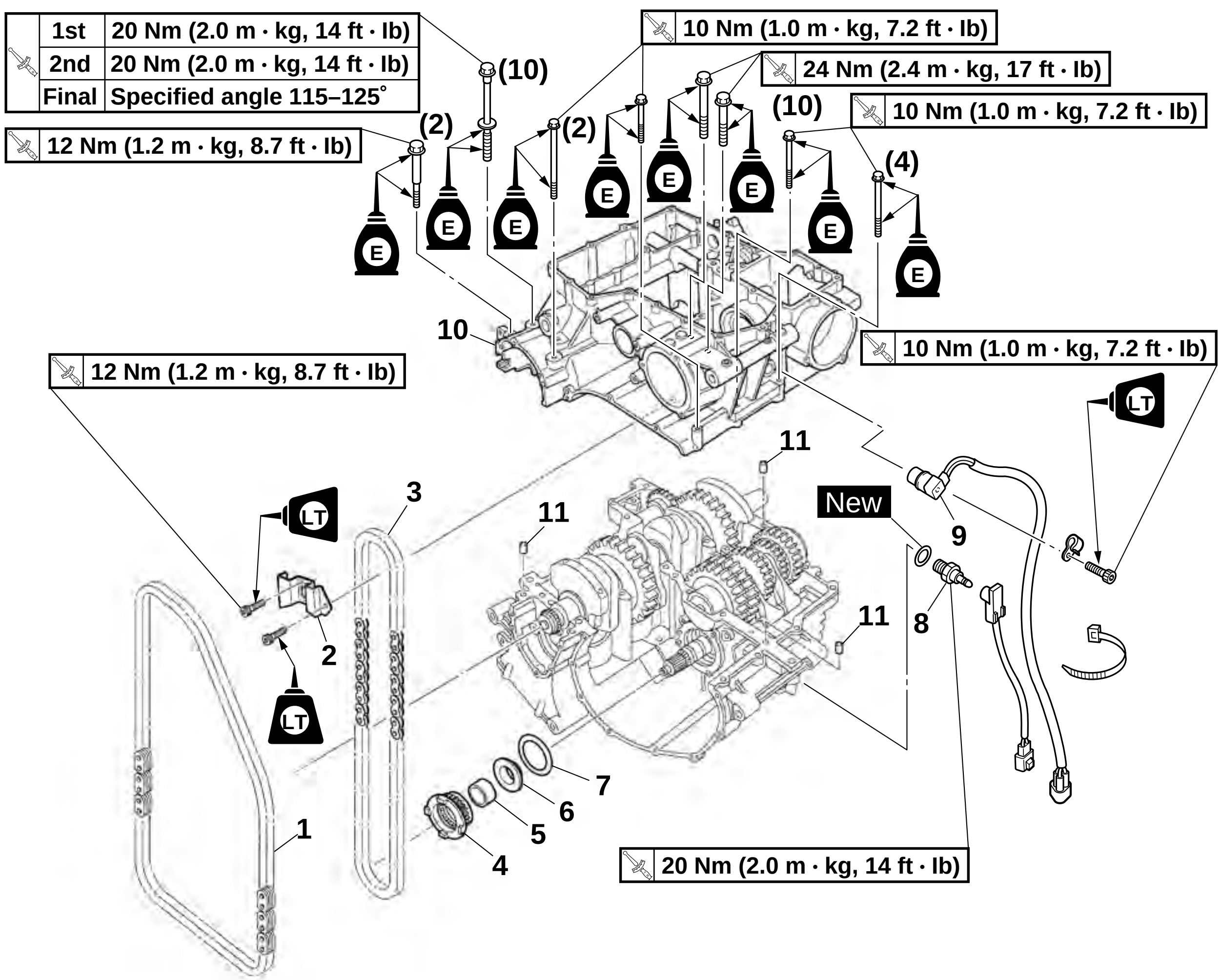
Order	Job/Parts to remove	Q'ty	Remarks
9	Lower crankcase	1	
10	Dowel pin	3	
			For installation, reverse the removal procedure.

Separating the crankcase (FJR13AE)



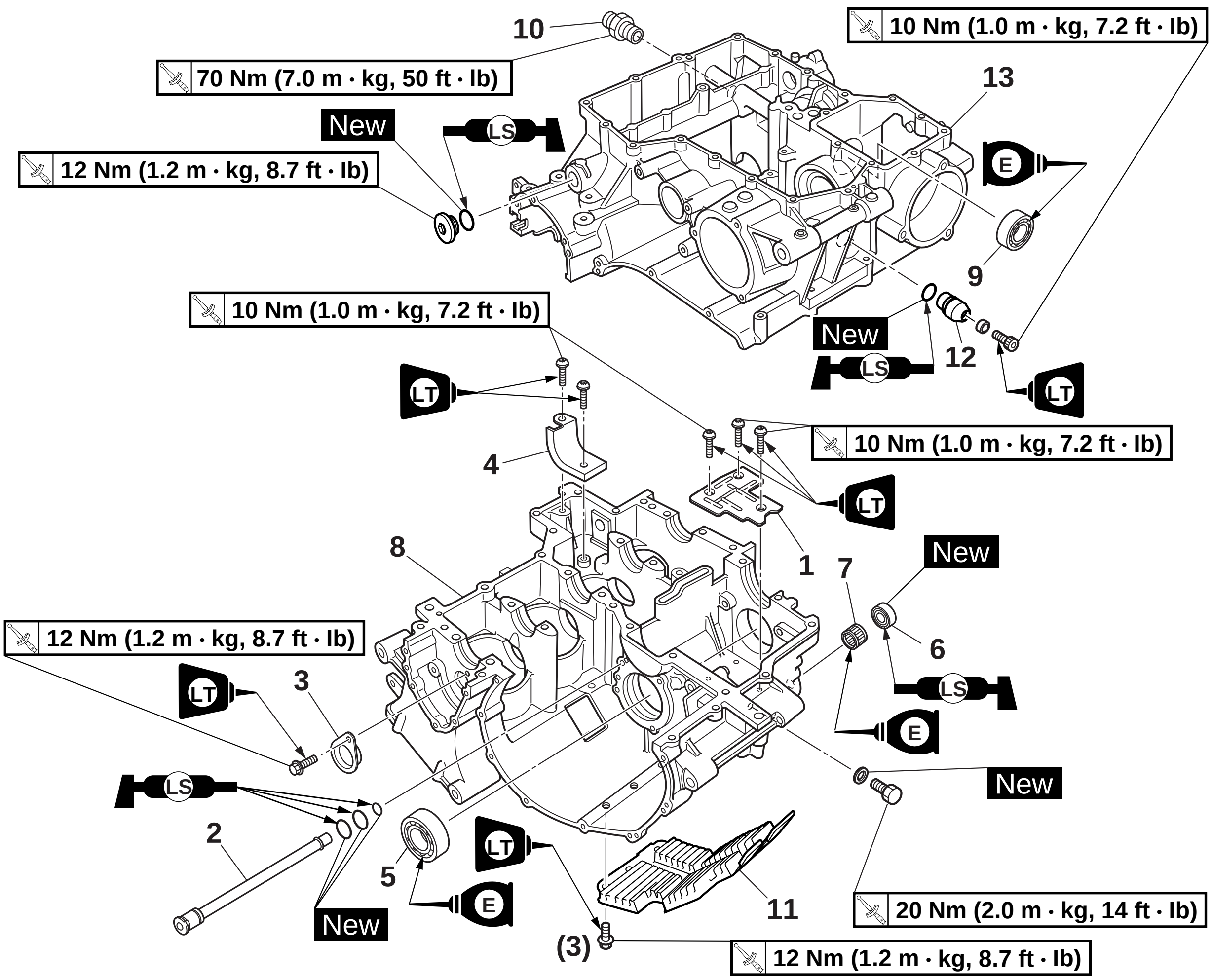
Order	Job/Parts to remove	Q'ty	Remarks
	Engine		Refer to "ENGINE REMOVAL" on page 5-1.
	Cylinder head		Refer to "CYLINDER HEAD" on page 5-22.
	Starter clutch		Refer to "GENERATOR AND STARTER CLUTCH" on page 5-33.
	Pickup rotor		Refer to "PICKUP ROTOR" on page 5-39.
	Oil pump		Refer to "OIL PUMP" on page 5-82.
	Middle drive shaft assembly		Refer to "MIDDLE GEAR" on page 5-87.
	Clutch housing		Refer to "CLUTCH" on page 5-46.
1	Timing chain	1	
2	Oil pump drive chain guide	1	
3	Oil pump drive chain	1	
4	Oil pump drive sprocket	1	
5	Spacer	1	
6	Collar	1	
7	Spring washer	1	
8	Neutral switch	1	
9	YCC-S speed sensor	1	
10	Lower crankcase	1	

Separating the crankcase (FJR13AE)



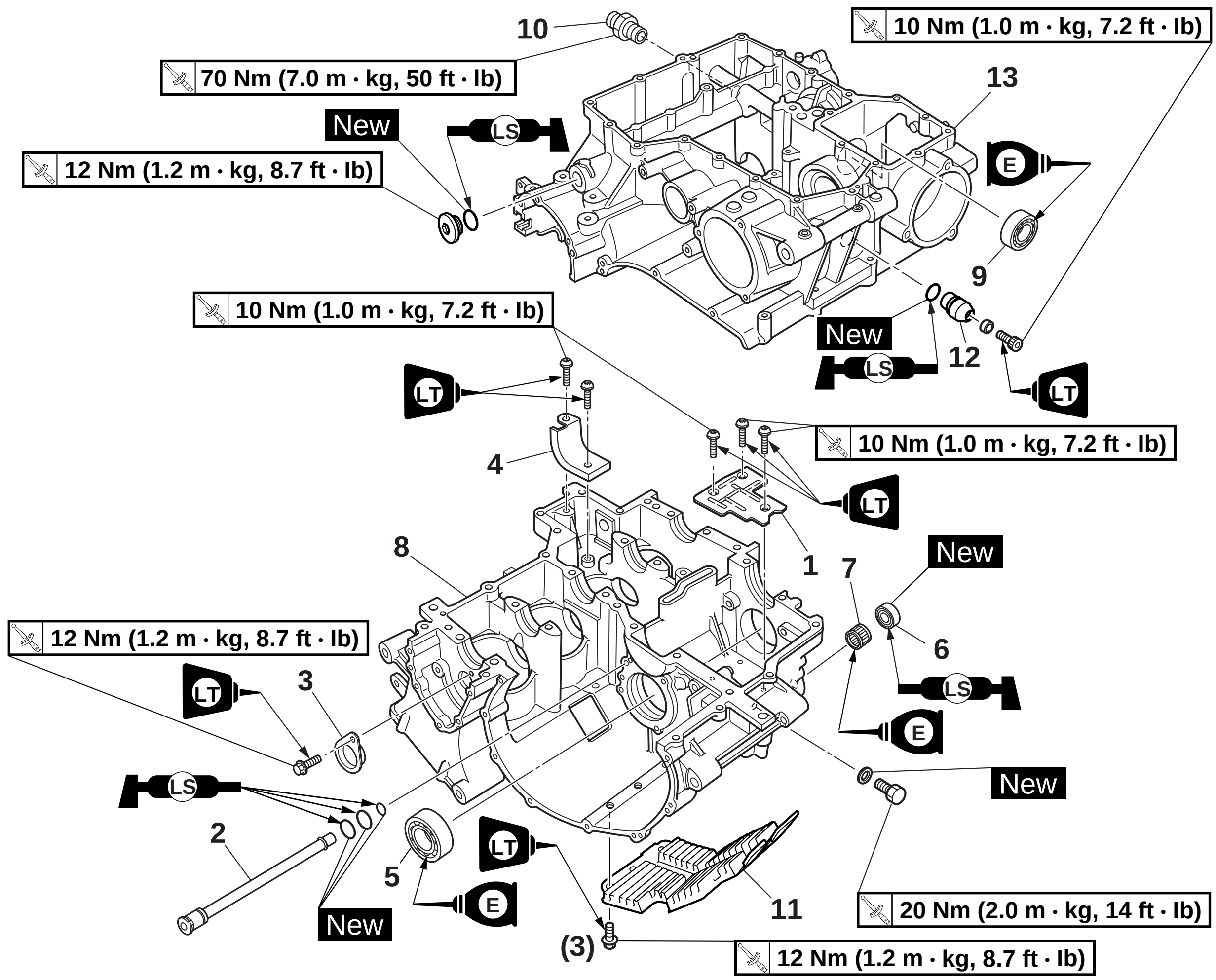
Order	Job/Parts to remove	Q'ty	Remarks
11	Dowel pin	3	
			For installation, reverse the removal procedure.

Removing the oil baffle plate and bearings



Order	Job/Parts to remove	Q'ty	Remarks
	Connecting rod		Refer to “CONNECTING RODS AND PISTONS” on page 5-111.
	Crankshaft/Crankshaft journal bearings		Refer to “CRANKSHAFT” on page 5-120.
	Transmission		Refer to “TRANSMISSION” on page 5-124.
1	Oil baffle plate 2	1	
2	Oil delivery pipe 1	1	
3	Plate	1	
4	Oil baffle plate 3	1	
5	Bearing	1	
6	Oil seal	1	
7	Bearing	1	
8	Upper crankcase	1	
9	Bearing	1	
10	Oil filter cartridge bolt	1	
11	Upper crankcase damper	1	
12	Crankcase plug	1	

Removing the oil baffle plate and bearings



Order	Job/Parts to remove	Q'ty	Remarks
13	Lower crankcase	1	
			For installation, reverse the removal procedure.

EAS25550

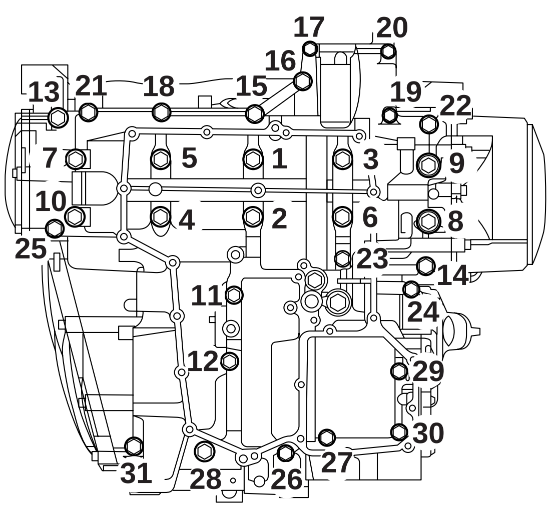
DISASSEMBLING THE CRANKCASE

1. Place the engine upside down.
2. Remove:
   - Crankcase bolts

TIP

- Loosen each bolt 1/4 of a turn at a time, in stages and in a crisscross pattern. After all of the bolts are fully loosened, remove them.
- Loosen the bolts in decreasing numerical order (refer to the numbers in the illustration).
- The numbers embossed on the crankcase indicate the crankcase tightening sequence.

- M9 × 115 mm bolts: “1”–“10”
- M8 × 65 mm bolt: “11”
- M8 × 50 mm bolt: “12”
- M6 × 80 mm bolts: “23”, “25”
- M6 × 65 mm shoulder bolts: “13”, “14”
- M6 × 65 mm bolts: “19”, “22”, “24”, “26”
- M6 × 55 mm bolts: “15”–“18”, “20”, “21”, “27”–“30”
- M6 × 45 mm bolt: “31”



3. Remove:
   - Lower crankcase

ECA13900

NOTICE

Tap on one side of the crankcase with a soft-face hammer. Tap only on reinforced portions of the crankcase, not on the crankcase mating surfaces. Work slowly and carefully and make sure the crankcase halves separate evenly.

EAS25580

CHECKING THE CRANKCASE

1. Thoroughly wash the crankcase halves in a mild solvent.
2. Thoroughly clean all the gasket surfaces and crankcase mating surfaces.
3. Check:
   - Crankcase
     Cracks/damage → Replace.
   - Oil delivery passages
     Obstruction → Blow out with compressed air.

EAS25600

CHECKING THE OIL DELIVERY PIPES

The following procedure applies to all of the oil delivery pipes.

1. Check:
   - Oil delivery pipe
     Damage → Replace.
     Obstruction → Wash and blow out with compressed air.

ET3P61026

CHECKING THE BEARINGS AND OIL SEAL

1. Check:
   - Bearings
     Clean and lubricate the bearings, then rotate the inner race with your finger.
     Rough movement → Replace.
   - Oil seal
     Damage/wear → Replace.

EAS25620

CHECKING THE TIMING CHAIN AND OIL PUMP DRIVE CHAIN

1. Check:
   - Timing chain
     Damage/stiffness → Replace the timing chain and camshaft sprockets as a set.
   - Oil pump drive chain
     Damage/stiffness → Replace the oil pump drive chain, oil pump drive sprocket and oil pump shaft as a set.
2. Check:
   - Oil pump drive sprocket
     Cracks/damage/wear → Replace the oil pump drive sprocket and the oil pump drive chain as a set.

EAS25680
ASSEMBLING THE CRANKCASE

1. Lubricate:
   - Crankshaft journal bearings
     (with the recommended lubricant)

	Recommended lubricant **Engine oil**

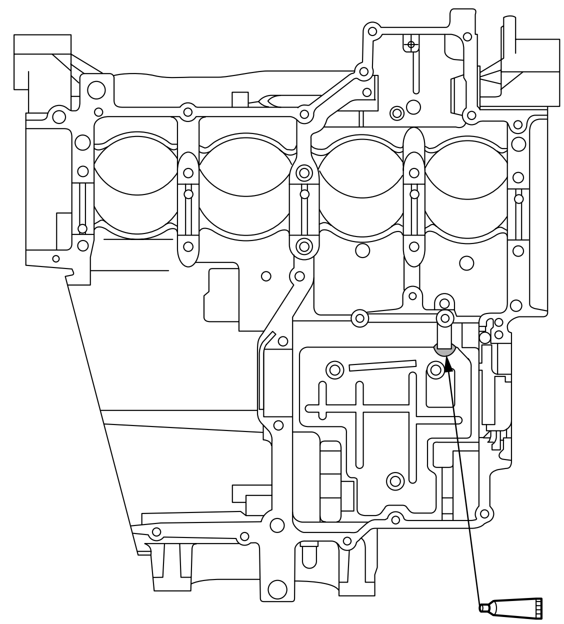
2. Apply:
   - Sealant
     (onto the crankcase mating surfaces and oil baffle plate 2)

	Yamaha bond No. 1215 **90890-85505** **(Three Bond No.1215®)**

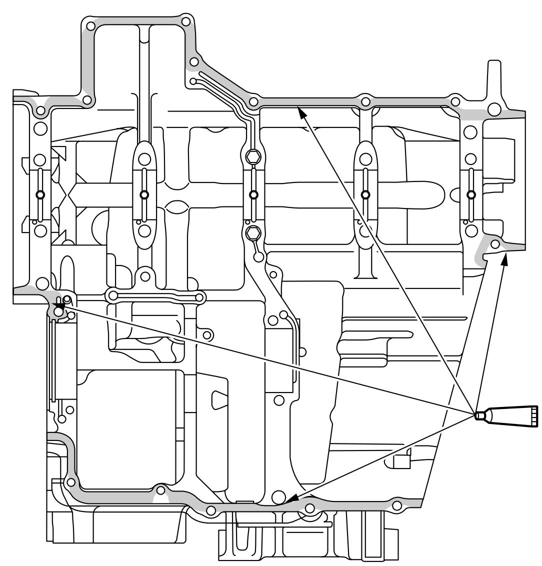
TIP

Do not allow any sealant to come into contact with the oil gallery or crankshaft journal bearings. Do not apply sealant to within 2–3 mm (0.08–0.12 in) of the crankshaft journal bearings.

A

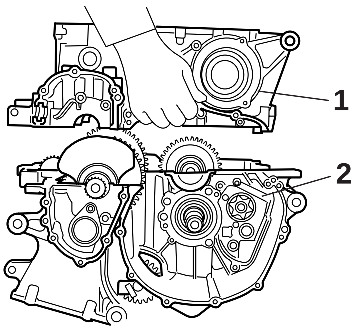


B



A. Upper crankcase
B. Lower crankcase

3. Install:
   - Dowel pins
4. Set the shift drum assembly and transmission gears in the neutral position.
5. Install:
   - Lower crankcase "1"
     (onto the upper crankcase "2")



ECA13980

NOTICE

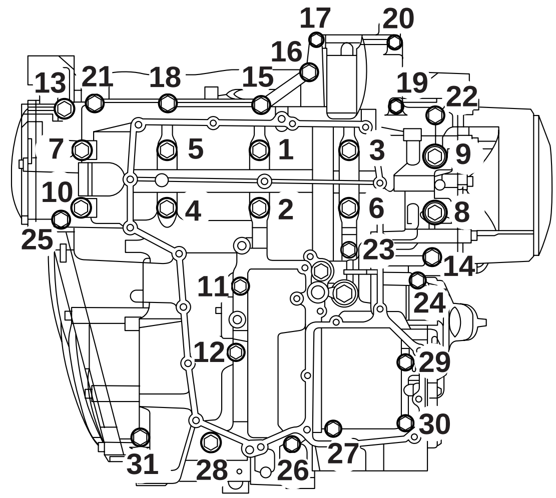
Before tightening the crankcase bolts, make sure the transmission gears shift correctly when the shift drum assembly is turned by hand.

6. Install:
   - Crankcase bolts

TIP

- Lubricate the bolts “1”–“10” thread and washers with engine oil.
- Lubricate the bolts “11”–“31” thread part and mating surface with engine oil.
- Apply locking agent (LOCTITE®) to the threads of the bolt “16”.
- Finger tighten the crankcase bolts.

- M9 × 115 mm bolts: “1”–“10” New
- M8 × 65 mm bolt: “11”
- M8 × 50 mm bolt: “12”
- M6 × 80 mm bolts: “23”, “25”
- M6 × 65 mm shoulder bolts: “13”, “14”
- M6 × 65 mm bolts: “19”, “22”, “24”, “26”
- M6 × 55 mm bolts: “15”–“18”, “20”, “21”, “27”–“30”
- M6 × 45 mm bolt: “31”



7. Tighten:
   - Crankcase bolts (M9 × 115 mm) “1”–“10” New

EW3P61013

WARNING

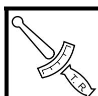
Replace the bolts with new ones.

TIP

The tightening procedure of crankcase bolts “1”–“10” is angle controlled, therefore tighten the bolts using the following procedure.

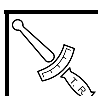
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a. Tighten the crankcase bolts in the proper tightening sequence as shown.



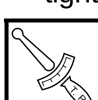
Crankcase bolt “1”–“10”
1st
20 Nm (2.0 m·kg, 14 ft·lb)

b. Loosen and retighten the crankcase bolts in the proper tightening sequence as shown.



Crankcase bolt “1”–“10”
2nd
20 Nm (2.0 m·kg, 14 ft·lb)

c. Tighten the crankcase bolts further to reach the specified angle 115–125° in the proper tightening sequence as shown.



Crankcase bolt “1”–“10”
Final
Specified angle 115–125°

EW3P61014

WARNING

If the bolt is tightened more than the specified angle, do not loosen the bolt and then retighten it. Instead, replace the bolt with a new one and perform the procedure again.

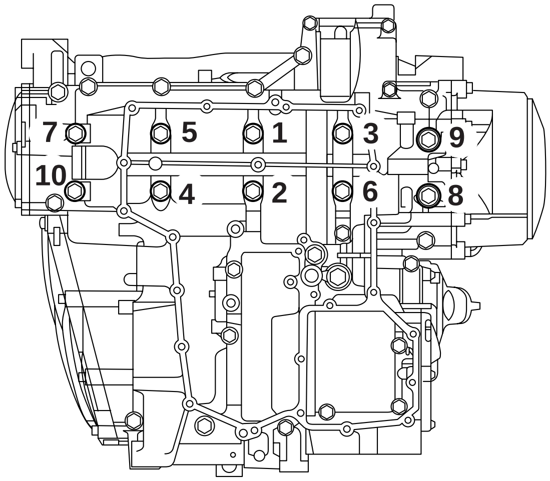
EC3P61033

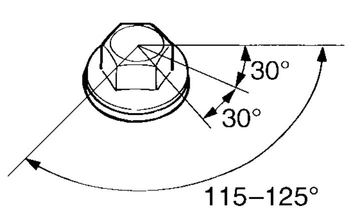
NOTICE

- **Do not use a torque wrench to tighten the bolt to the specified angle.**
- **Tighten the bolt until it is at the specified angle.**

TIP

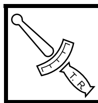
On a hexagonal bolt, note that the angle from one corner to another is 60°.





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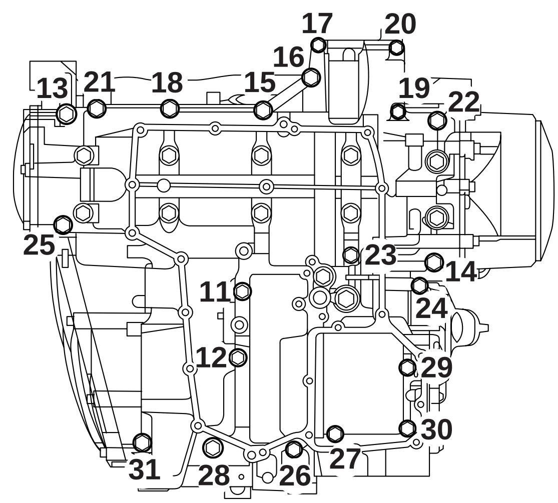
8. Tighten:
   - Crankcase bolts “11”–“31”



Crankcase bolt “11”, “12”
24 Nm (2.4 m·kg, 17 ft·lb)
Crankcase bolt “13”, “14”
12 Nm (1.2 m·kg, 8.7 ft·lb)
Crankcase bolt “15”–“31”
10 Nm (1.0 m·kg, 7.2 ft·lb)

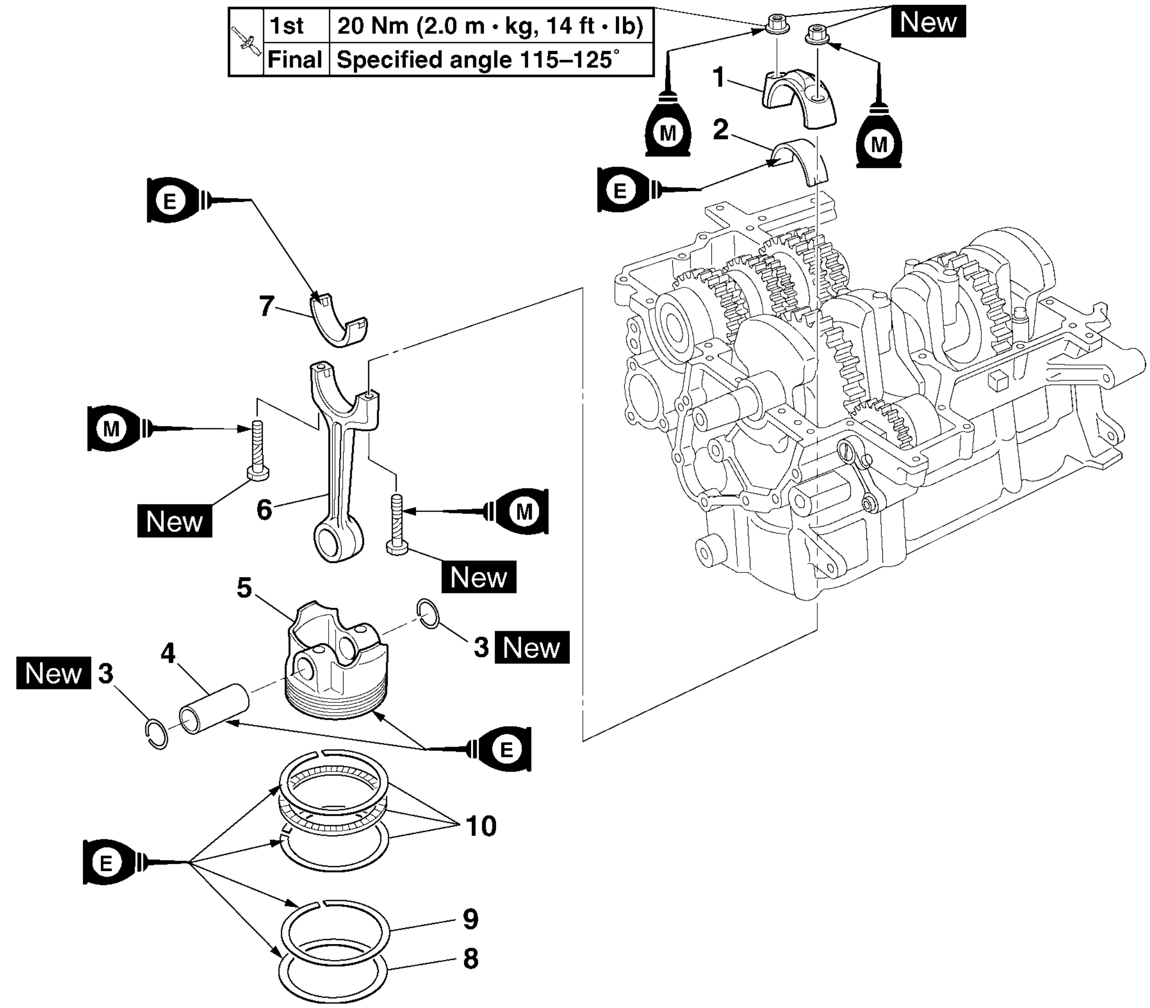
TIP

Tighten the crankcase bolts in the proper tightening sequence as shown.



ET3P61027
CONNECTING RODS AND PISTONS

Removing the connecting rods and pistons



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-101.
1	Connecting rod cap	4	
2	Big end lower bearing	4	
3	Piston pin clip	8	
4	Piston pin	4	
5	Piston	4	
6	Connecting rod	4	
7	Big end upper bearing	4	
8	Top ring	4	
9	2nd ring	4	
10	Oil ring	4	
			For installation, reverse the removal procedure.

EAS26030

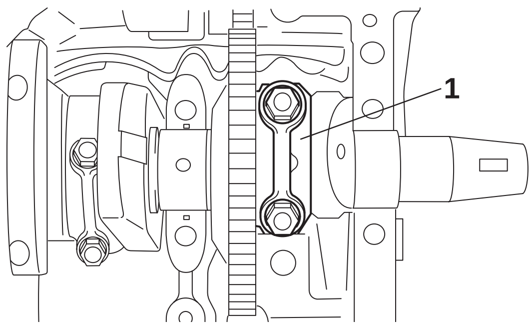
REMOVING THE CONNECTING RODS AND PISTONS

The following procedure applies to all of the connecting rods and pistons.

1. Remove:
   • Connecting rod cap "1"

TIP

Identify the position of each connecting rod so that it can be reinstalled in its original place.



2. Remove:
   • Big end bearings
   (from the connecting rods and connecting rod caps)

TIP

Identify the position of each big end bearing so that it can be reinstalled in its original place.

3. Remove:
   • Piston pin clips "1"
   • Piston pin "2"
   • Piston "3"
   • Connecting rod "4"

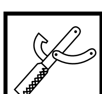
ECA13810

NOTICE

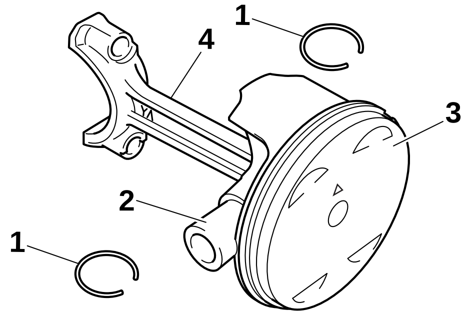
Do not use a hammer to drive the piston pin out.

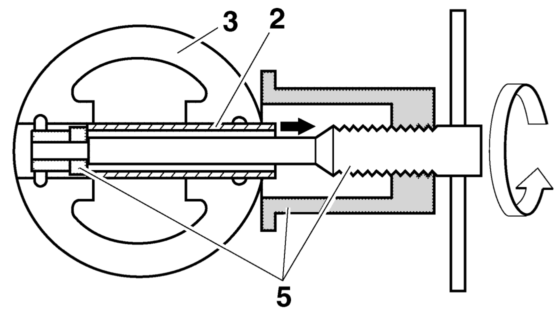
TIP

- For reference during installation, put an identification mark on each piston crown.
- Before removing the piston pin, deburr the piston pin clip's groove and the piston's pin bore area. If both areas are deburred and the piston pin is still difficult to remove, remove it with the piston pin puller set "5".



Piston pin puller set
90890-01304
Piston pin puller
YU-01304

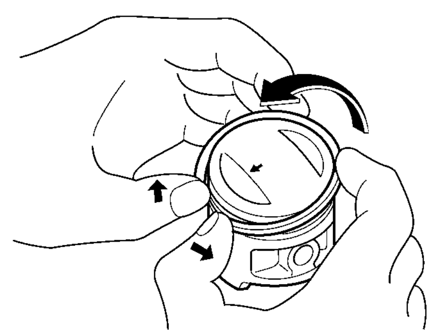




4. Remove:
   • Top ring
   • 2nd ring
   • Oil ring

TIP

When removing a piston ring, open the end gap with your fingers and lift the other side of the ring over the piston crown.



EAS24410

CHECKING THE CYLINDERS AND PISTONS

The following procedure applies to all of the cylinders and pistons.

1. Check:
   • Piston wall
   • Cylinder wall
   Vertical scratches → Rebore or replace the cylinder, and replace the piston and piston rings as a set.
2. Measure:
   • Piston-to-cylinder clearance

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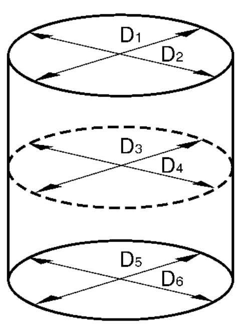
a. Measure cylinder bore “C” with the cylinder bore gauge.

TIP

Measure cylinder bore “C” by taking side-to-side and front-to-back measurements of the cylinder. Then, find the average of the measurements.

Bore
79.000–79.010 mm (3.1102–3.1106 in)
Taper limit
0.050 mm (0.0020 in)
Out of round limit
0.050 mm (0.0020 in)

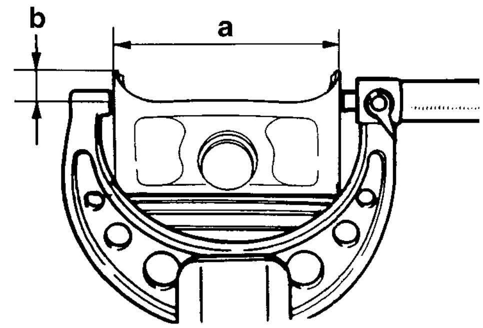
“C” = maximum of D_1–D_6
“T” = maximum of D_1 or D_2 - maximum of D_5 or D_6
“R” = maximum of D_1, D_3 or D_5 - minimum of D_2, D_4 or D_6



b. If out of specification, rebore or replace the cylinder, and replace the piston and piston rings as a set.

c. Measure piston skirt diameter “D” “a” with the micrometer.

Piston
Diameter D
78.965–78.980 mm (3.1089–3.1094 in)



b. 5 mm (0.20 in) from the bottom edge of the piston

d. If out of specification, replace the piston and piston rings as a set.

e. Calculate the piston-to-cylinder clearance with the following formula.

- Piston-to-cylinder clearance = Cylinder bore “C” - Piston skirt diameter “D”

Piston-to-cylinder clearance
0.020–0.045 mm (0.0008–0.0018 in)
Limit
0.12 mm (0.0047 in)

f. If out of specification, rebore or replace the cylinder, and replace the piston and piston rings as a set.

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EAS24430

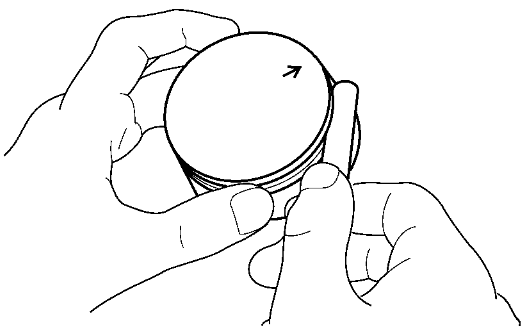
CHECKING THE PISTON RINGS

1. Measure:
   - Piston ring side clearance
     Out of specification → Replace the piston and piston rings as a set.

TIP

Before measuring the piston ring side clearance, eliminate any carbon deposits from the piston ring grooves and piston rings.

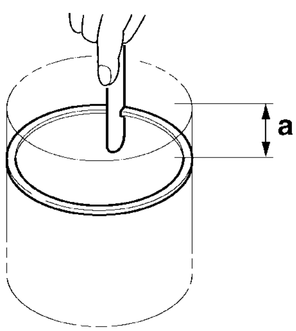
Piston ring
Top ring
Ring side clearance
0.030–0.070 mm (0.0012–0.0028 in)
Limit
0.120 mm (0.0047 in)
2nd ring
Ring side clearance
0.020–0.060 mm (0.0008–0.0024 in)
Limit
0.120 mm (0.0047 in)



2. Install:
   • Piston ring
   (into the cylinder)

TIP

Level the piston ring into the cylinder with the piston crown.



a. 5 mm (0.20 in)

3. Measure:
   • Piston ring end gap
   Out of specification → Replace the piston ring.

TIP

The oil ring expander spacer's end gap cannot be measured. If the oil ring rail's gap is excessive, replace all three piston rings.

Piston ring
Top ring
End gap (installed)
0.35–0.45 mm (0.0138–0.0177 in)
Limit
0.70 mm (0.0276 in)
2nd ring
End gap (installed)
0.75–0.85 mm (0.0295–0.0335 in)
Limit
1.20 mm (0.0472 in)
Oil ring
End gap (installed)
0.20–0.60 mm (0.0079–0.0236 in)

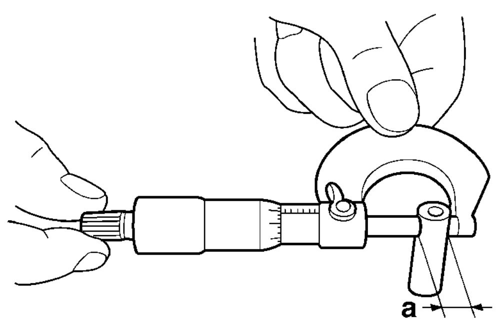
EAS24440

CHECKING THE PISTON PIN

The following procedure applies to all of the piston pins.

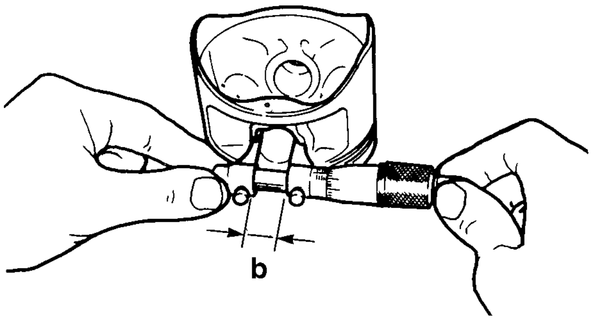
1. Check:
   • Piston pin
   Blue discoloration/grooves → Replace the piston pin and then check the lubrication system.
2. Measure:
   • Piston pin outside diameter "a"
   Out of specification → Replace the piston pin.

Piston pin outside diameter
18.991–19.000 mm (0.7477–0.7480 in)
Limit
18.971 mm (0.7469 in)



3. Measure:
   • Piston pin bore diameter "b"
   Out of specification → Replace the piston.

Piston pin bore inside diameter
19.004–19.015 mm (0.7482–0.7486 in)
Limit
19.045 mm (0.7498 in)



4. Calculate:
   - Piston-pin-to-piston-pin-bore clearance
     Out of specification → Replace the piston pin and piston as a set.

- Piston-pin-to-piston-pin-bore clearance =
  Piston pin bore diameter “b” -
  Piston pin outside diameter “a”

Piston-pin-to-piston-pin-bore clearance
0.004–0.024 mm (0.00016–0.00094 in)

ET3P61028

CHECKING THE CONNECTING RODS

1. Measure:
   - Crankshaft-pin-to-big-end-bearing clearance
     Out of specification → Replace the big end bearings.

Oil clearance (using plasti-gauge®)
0.031–0.048 mm (0.0012–0.0019 in)

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The following procedure applies to all of the connecting rods.

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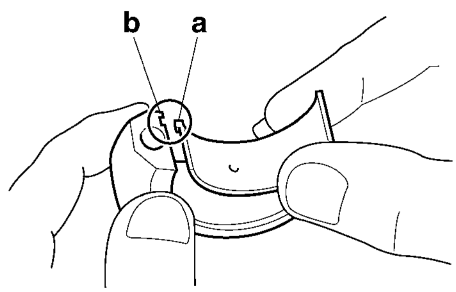
NOTICE

Do not interchange the big end bearings and connecting rods. To obtain the correct crankshaft-pin-to-big-end-bearing clearance and prevent engine damage, the big end bearings must be installed in their original positions.

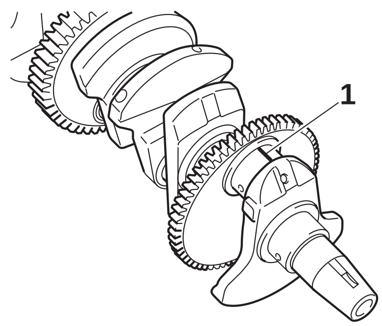
a. Clean the big end bearings, crankshaft pins, and the inside of the connecting rod halves.
b. Install the big end upper bearing into the connecting rod and the big end lower bearing into the connecting rod cap.

TIP

Align the projections “a” on the big end bearings with the notches “b” in the connecting rod and connecting rod cap.



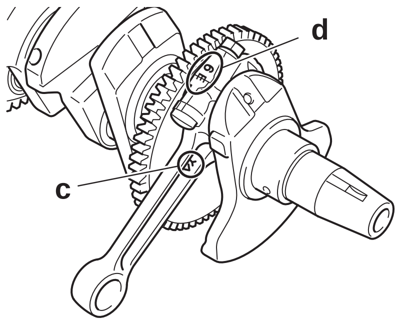
c. Put a piece of Plastigauge® “1” on the crankshaft pin.



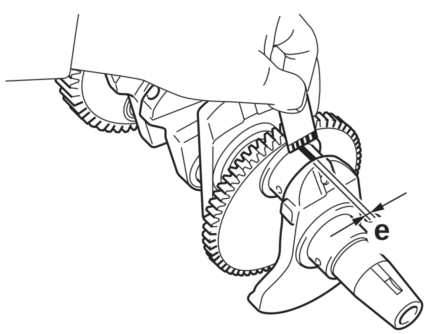
d. Assemble the connecting rod halves.

TIP

- Do not move the connecting rod or crankshaft until the clearance measurement has been completed.
- Lubricate the bolt threads and nut seats with molybdenum disulfide grease.
- Make sure the “Y” mark “c” on the connecting rod faces towards the left side of the crankshaft.
- Make sure the characters “d” on both the connecting rod and connecting rod cap are aligned.



e. Tighten the connecting rod nuts.
Refer to "INSTALLING THE CONNECTING RODS AND PISTONS" on page 5-116.
f. Remove the connecting rod and big end bearings.
Refer to "REMOVING THE CONNECTING RODS AND PISTONS" on page 5-112.
g. Measure the compressed Plastigauge® width "e" on the crankshaft pin.
If the crankshaft-pin-to-big-end-bearing clearance is out of specification, select replacement big end bearings.

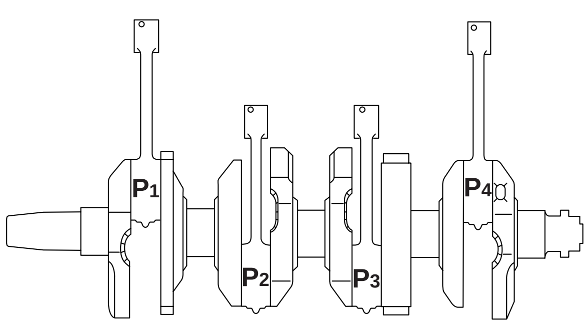


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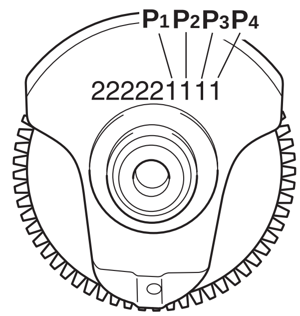
2. Select:
   • Big end bearings (P_1–P_4)

TIP

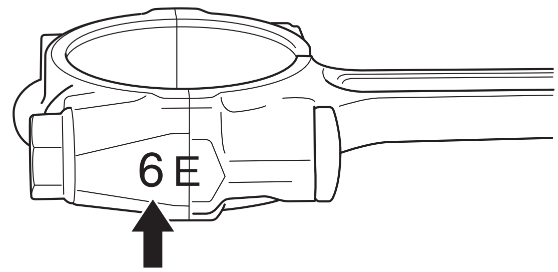
• The numbers "A" stamped into the crankshaft web and the numbers "B" on the connecting rods are used to determine the replacement big end bearing sizes.
• P_1–P_4 refer to the bearings shown in the crankshaft illustration.



A



B



For example, if the connecting rod P_1 and the crankshaft web P_1 numbers are 6 and 1 respectively, then the bearing size for P_1 is:

P_1 (connecting rod) - P_1 (crankshaft) = 6 - 1 = 5 (yellow)

Bearing color code
1.Blue 2.Black 3.Brown 4.Green 5.Yellow 6.Pink

EAS26170

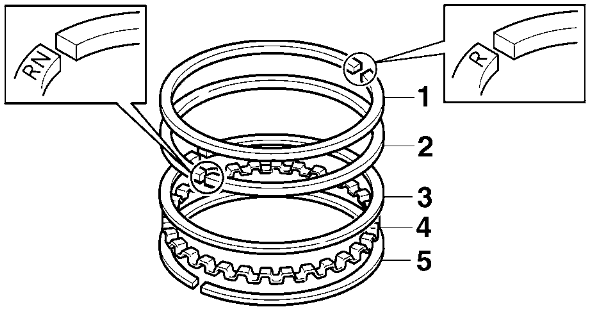
INSTALLING THE CONNECTING RODS AND PISTONS

The following procedure applies to all of the pistons and connecting rods.

1. Install:
   • Top ring "1"
   • 2nd ring "2"
   • Upper oil ring rail "3"
   • Oil ring expander "4"
   • Lower oil ring rail "5"

TIP

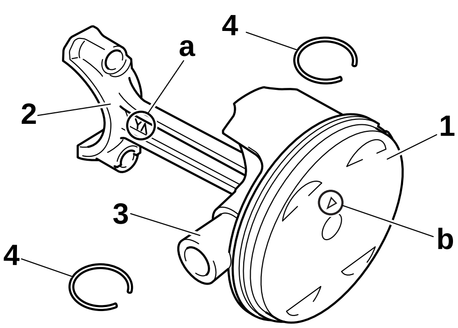
Be sure to install the piston rings so that the manufacturer's marks face up.

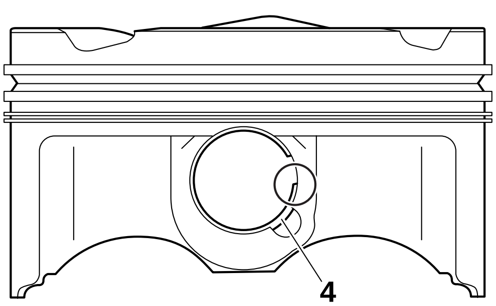


2. Install:
   - Piston “1”
     (onto the respective connecting rod “2”)
   - Piston pin “3”
   - Piston pin clips “4” **New**

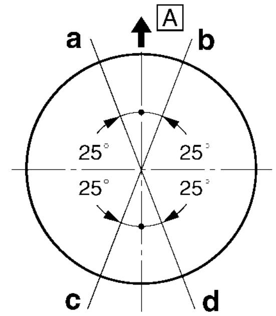
TIP

- Apply engine oil onto the piston pin.
- Make sure that the “Y” mark “a” on the connecting rod is facing to the left when the punch mark “b” on the piston is pointing up. Refer to the illustration.
- When installing a piston pin clip, make sure that the clip ends are positioned away from the cutout in the piston as shown in the illustration.
- Reinstall each piston into its original cylinder (numbering order starting from the left: #1 to #4).





3. Offset:
   - Piston ring end gaps



a. Top ring
b. Lower oil ring rail
c. Upper oil ring rail
d. 2nd ring
A. Intake side

4. Lubricate:
   - Piston
   - Piston rings
   - Cylinder
     (with the recommended lubricant)

	Recommended lubricant **Engine oil**

5. Lubricate:
   - Bolt threads
   - Nut seats
     (with the recommended lubricant)

	Recommended lubricant **Molybdenum disulfide oil**

6. Lubricate:
   - Crankshaft pins
   - Big end bearings
   - Connecting rod inner surface
     (with the recommended lubricant)

	Recommended lubricant **Engine oil**

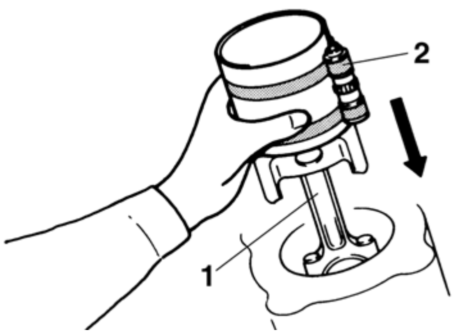
7. Install:
   - Big end bearings
   - Connecting rod assembly “1”
     (into the cylinder and onto the crankshaft pin)
   - Connecting rod cap
     (onto the crankshaft pin)

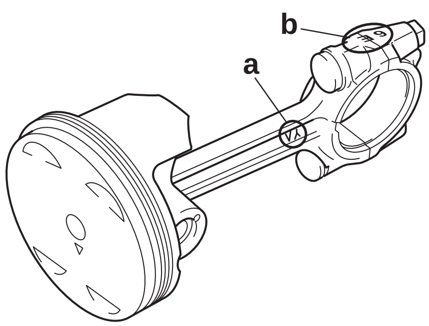
TIP

- Align the projections on the big end bearings with the notches in the connecting rods and connecting rod caps.
- Be sure to reinstall each big end bearing in its original place.

- While compressing the piston rings with piston ring compressor “2”, install the connecting rod assembly “1” into the cylinder with the other hand.
- Make sure the “Y” marks “a” on the connecting rods face towards the left side of the crankshaft.
- Make sure the characters “b” on both the connecting rod and connecting rod cap are aligned.

Piston ring compressor
90890-05158
YM-08037





8. Tighten:
   - Connecting rod nuts “1”

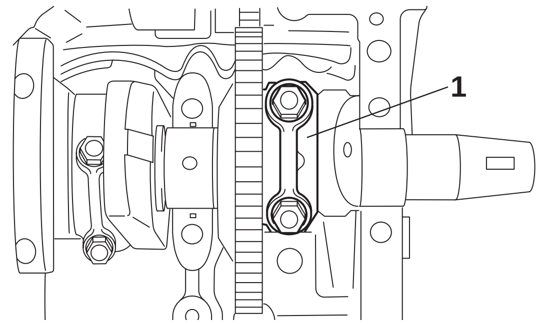
EW3P61019

WARNING

Replace the connecting rod bolts and nuts with new ones.

TIP

Tighten the connecting rod nuts using the following procedure.

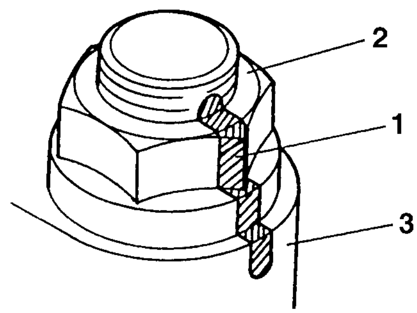


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a. Tighten the connecting rod nuts with a torque wrench.

Connecting rod nut (1st)
20 Nm (2.0 m·kg, 14 ft·lb)

b. Put a mark “1” on the corner of the connecting rod nut “2” and the connecting rod “3”.



c. Tighten the connecting rod nuts further to reach the specified angle 115–125°.

Connecting rod nut (final)
Specified angle 115–125°

EWA13400

WARNING

If the connecting rod nut is tightened more than the specified angle, do not loosen the nut and then retighten it. Instead, replace the connecting rod bolt and nut with a new one and perform the procedure again.

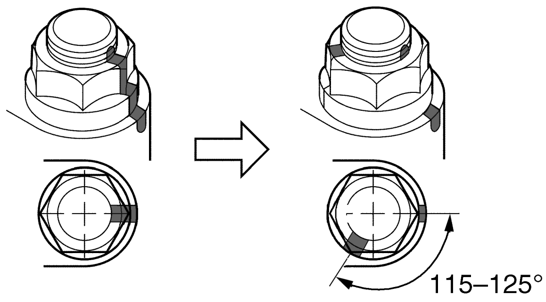
ECA13950

NOTICE

Do not use a torque wrench to tighten the connecting rod nut to the specified angle.

TIP

On a hexagonal nut, note that the angle from one corner to another is 60°.

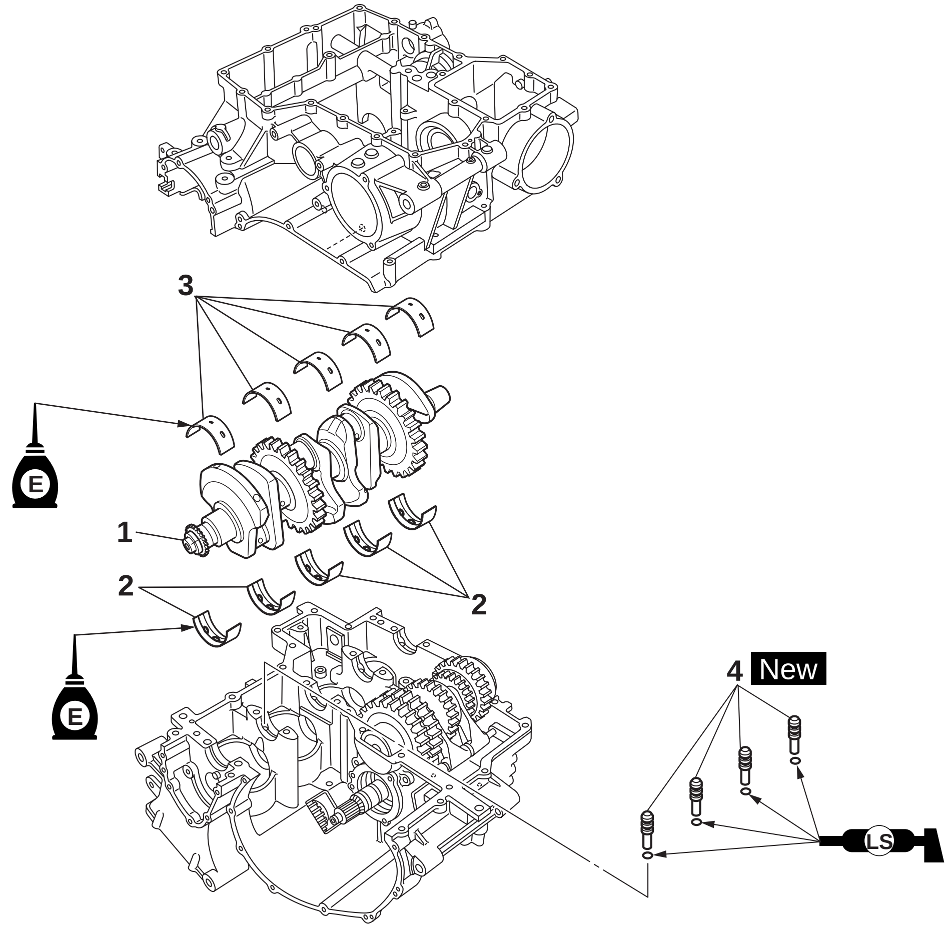

115–125°

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EAS25950

CRANKSHAFT

Removing the crankshaft



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-101.
	Front balancer weight		Refer to "BALANCERS" on page 5-136.
	Connecting rod caps		Refer to "CONNECTING RODS AND PISTONS" on page 5-111.
1	Crankshaft	1	
2	Crankshaft journal upper bearing	5	
3	Crankshaft journal lower bearing	5	
4	Oil nozzle	4	
			For installation, reverse the removal procedure.

EAS26040

REMOVING THE CRANKSHAFT JOURNAL BEARINGS

1. Remove:
   - Crankshaft journal upper bearings (from the upper crankcase)
   - Crankshaft journal lower bearings (from the lower crankcase)

TIP

Identify the position of each crankshaft journal bearing so that it can be reinstalled in its original place.

ET3P61029

CHECKING THE OIL NOZZLES

The following procedure applies to all of the oil nozzles.

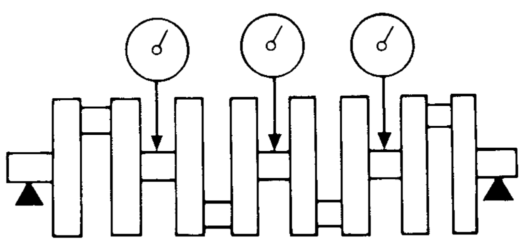
1. Check:
   - Oil nozzle
     Damage/wear → Replace the oil nozzle.
   - Oil passage
     Obstruction → Blow out with compressed air.

EAS26070

CHECKING THE CRANKSHAFT

1. Measure:
   - Crankshaft runout
     Out of specification → Replace the crankshaft.

Runout limit C
0.030 mm (0.0012 in)



2. Check:
   - Crankshaft journal surfaces
   - Crankshaft pin surfaces
   - Bearing surfaces
     Scratches/wear → Replace the crankshaft.
3. Measure:
   - Crankshaft-journal-to-crankshaft-journal-bearing clearance
     Out of specification → Replace the crankshaft journal bearings.

Journal oil clearance (using plastigauge®)
0.027–0.045 mm (0.0011–0.0018 in)

ECA13920

NOTICE

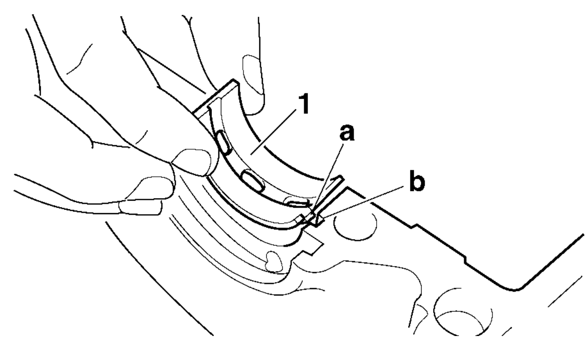
Do not interchange the crankshaft journal bearings. To obtain the correct crankshaft-journal-to-crankshaft-journal-bearing clearance and prevent engine damage, the crankshaft journal bearings must be installed in their original positions.

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a. Clean the crankshaft journal bearings, crankshaft journals, and bearing portions of the crankcase.
b. Place the upper crankcase upside down on a bench.
c. Install the crankshaft journal upper bearings “1” and the crankshaft into the upper crankcase.

TIP

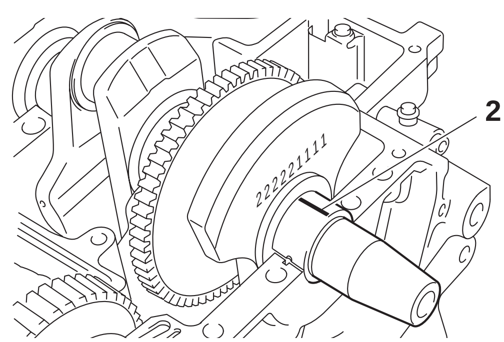
Align the projections “a” on the crankshaft journal upper bearings with the notches “b” in the upper crankcase.



d. Put a piece of Plastigauge® “2” on each crankshaft journal.

TIP

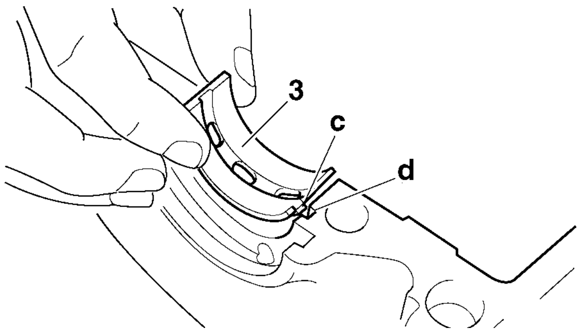
Do not put the Plastigauge® over the oil hole in the crankshaft journal.



e. Install the crankshaft journal lower bearings "3" into the lower crankcase and assemble the crankcase halves.

TIP

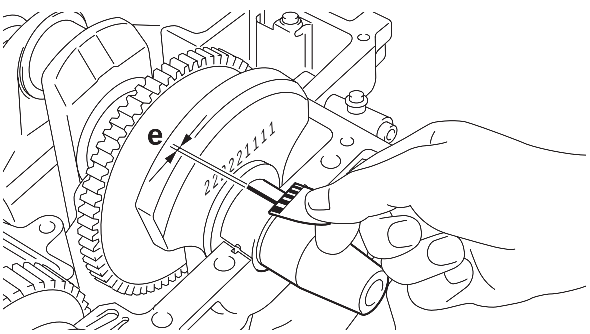
- Align the projections "c" of the crankshaft journal lower bearings with the notches "d" in the lower crankcase.
- Do not move the crankshaft until the clearance measurement has been completed.



f. Tighten the bolts to specification in the tightening sequence cast on the crankcase. Refer to "CRANKCASE" on page 5-101.

g. Remove the lower crankcase and the crankshaft journal lower bearings.

h. Measure the compressed Plastigauge® width "e" on each crankshaft journal. If the crankshaft-journal-to-crankshaft-journal-bearing clearance is out of specification, select replacement crankshaft journal bearings.

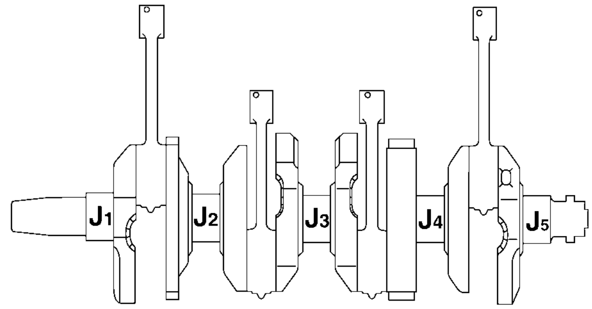


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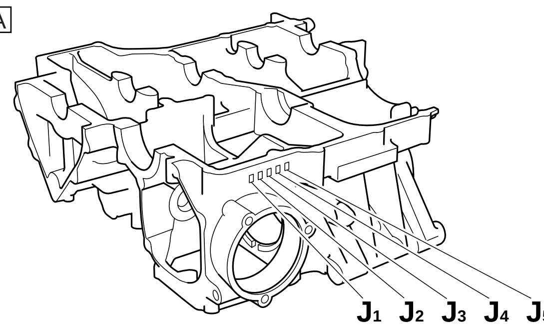
4. Select:
   - Crankshaft journal bearings (J_1–J_5)

TIP

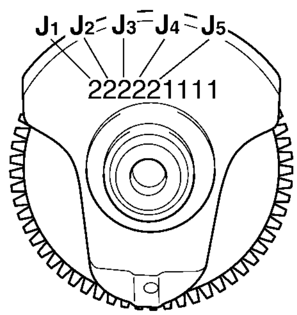
- The numbers "A" stamped into the lower crankcase and the numbers "B" stamped into the crankshaft web are used to determine the replacement crankshaft journal bearing sizes.
- J_1–J_5 refer to the bearings shown in the lower crankcase and crankshaft web illustration.
- If J_1–J_5 are the same, use the same size for all of the bearings.



A



B



For example, if the lower crankcase J_1 and crankshaft web J_1 numbers are 6 and 2 respectively, then the bearing size for J_1 is:

J_1 (crankcase) - J_1 (crankshaft web) + 2 = 6 - 2 + 2 = 6 (pink)

Bearing color code
2.Black 3.Brown 4.Green 5.Yellow 6.Pink 7.Red 8.White

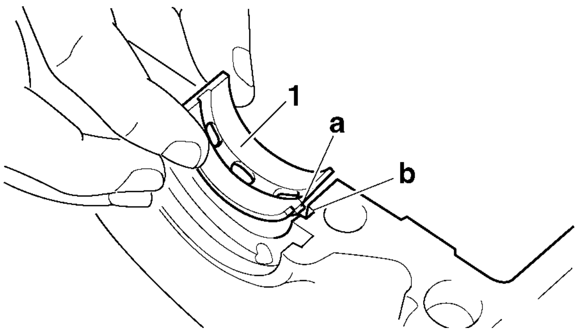
EAS26200

INSTALLING THE CRANKSHAFT

1. Install:
   - Crankshaft journal upper bearings (into the upper crankcase)
   - Crankshaft journal lower bearings (into the lower crankcase)

TIP

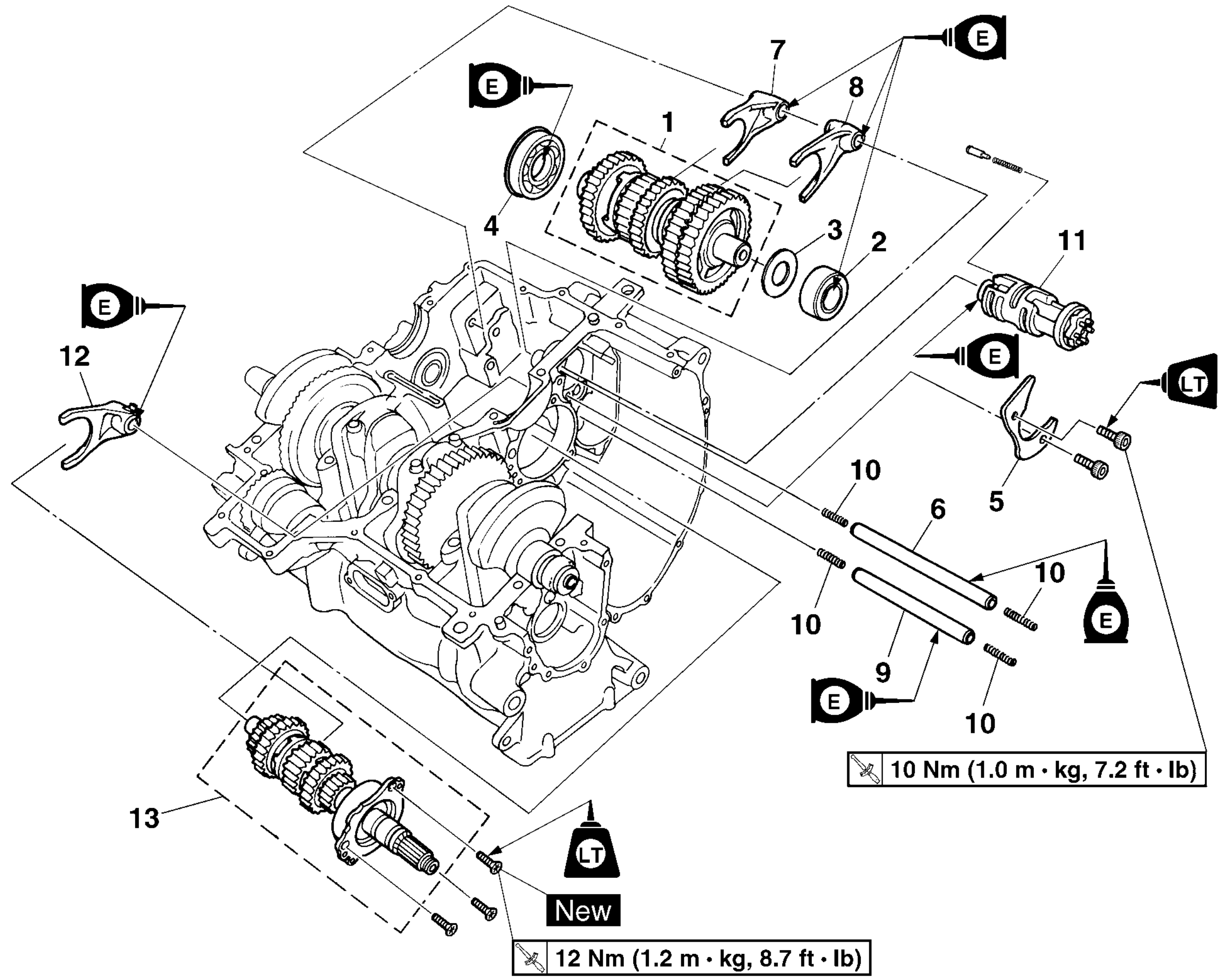
- Align the projections “a” on the crankshaft journal bearings “1” with the notches “b” in the crankcases.
- Be sure to install each crankshaft journal bearing in its original place.



EAS26240

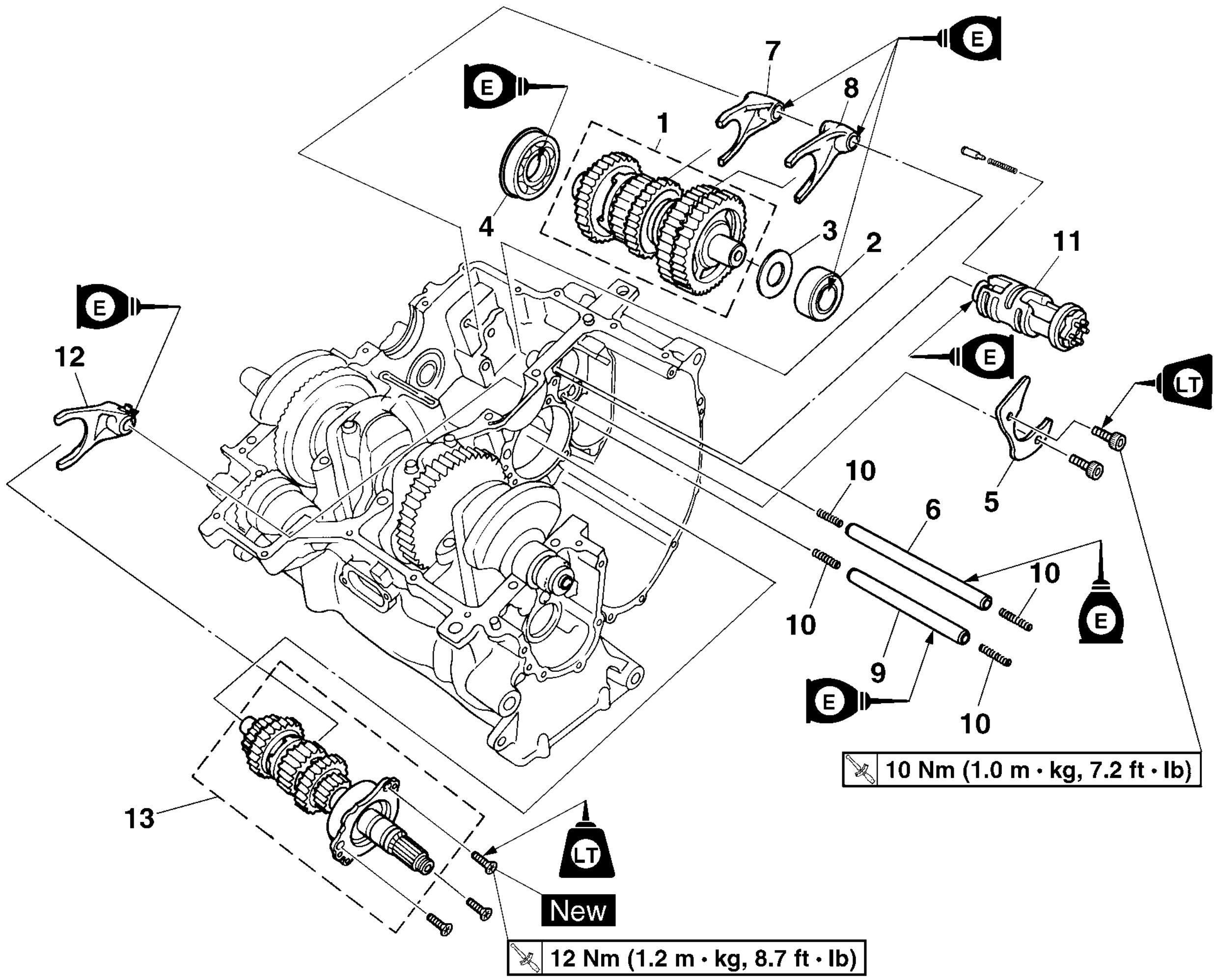
TRANSMISSION

Removing the transmission, shift drum assembly, and shift forks (FJR13A)



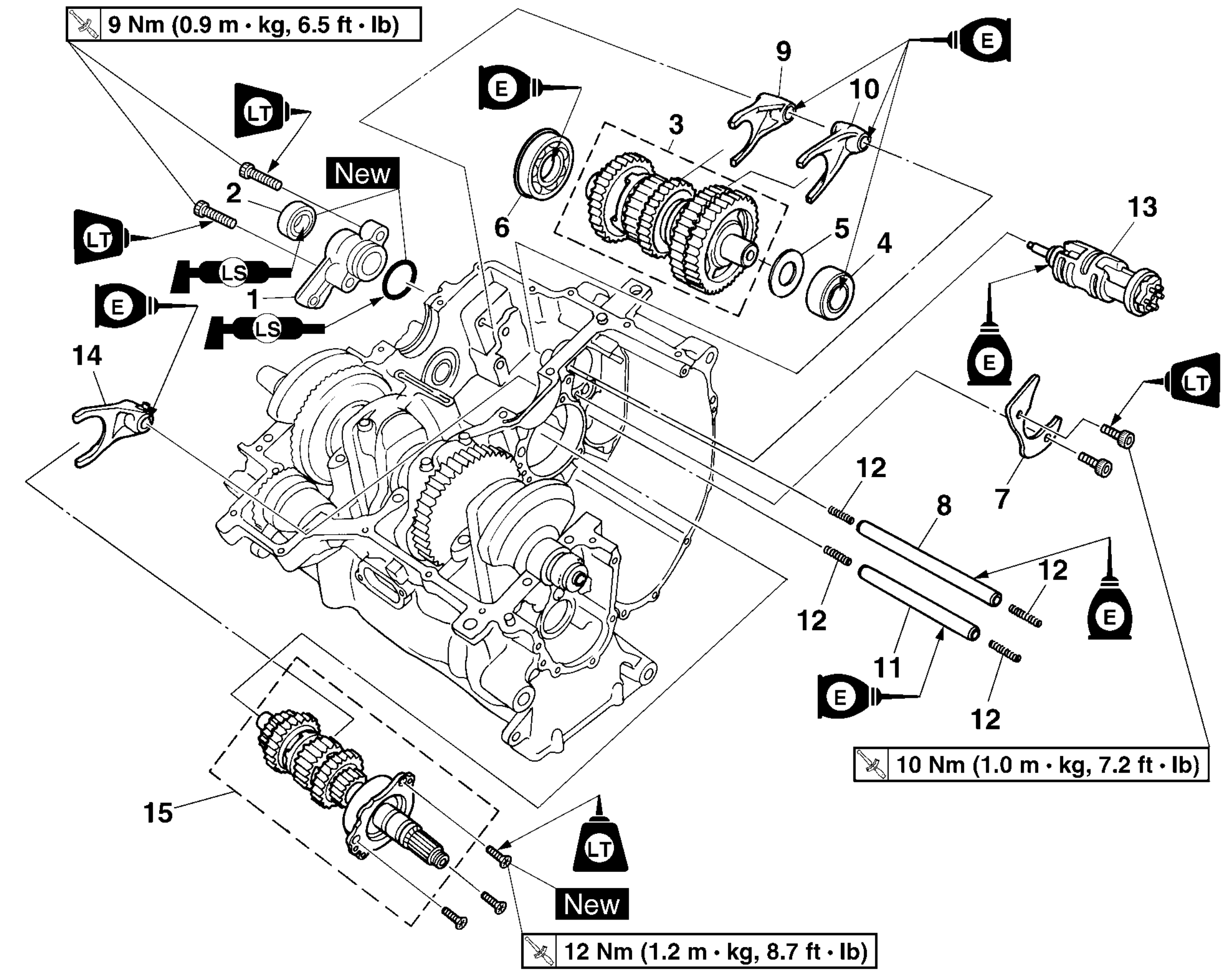
Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-101.
	Stopper lever		Refer to "SHIFT SHAFT" on page 5-79.
1	Drive axle assembly	1	
2	Bearing	1	
3	Washer	1	
4	Bearing	1	
5	Shift drum retainer	1	
6	Long shift fork guide bar	1	
7	Shift fork-L	1	
8	Shift fork-R	1	
9	Short shift fork guide bar	1	
10	Spring	4	
11	Shift drum assembly	1	
12	Shift fork-C	1	

Removing the transmission, shift drum assembly, and shift forks (FJR13A)



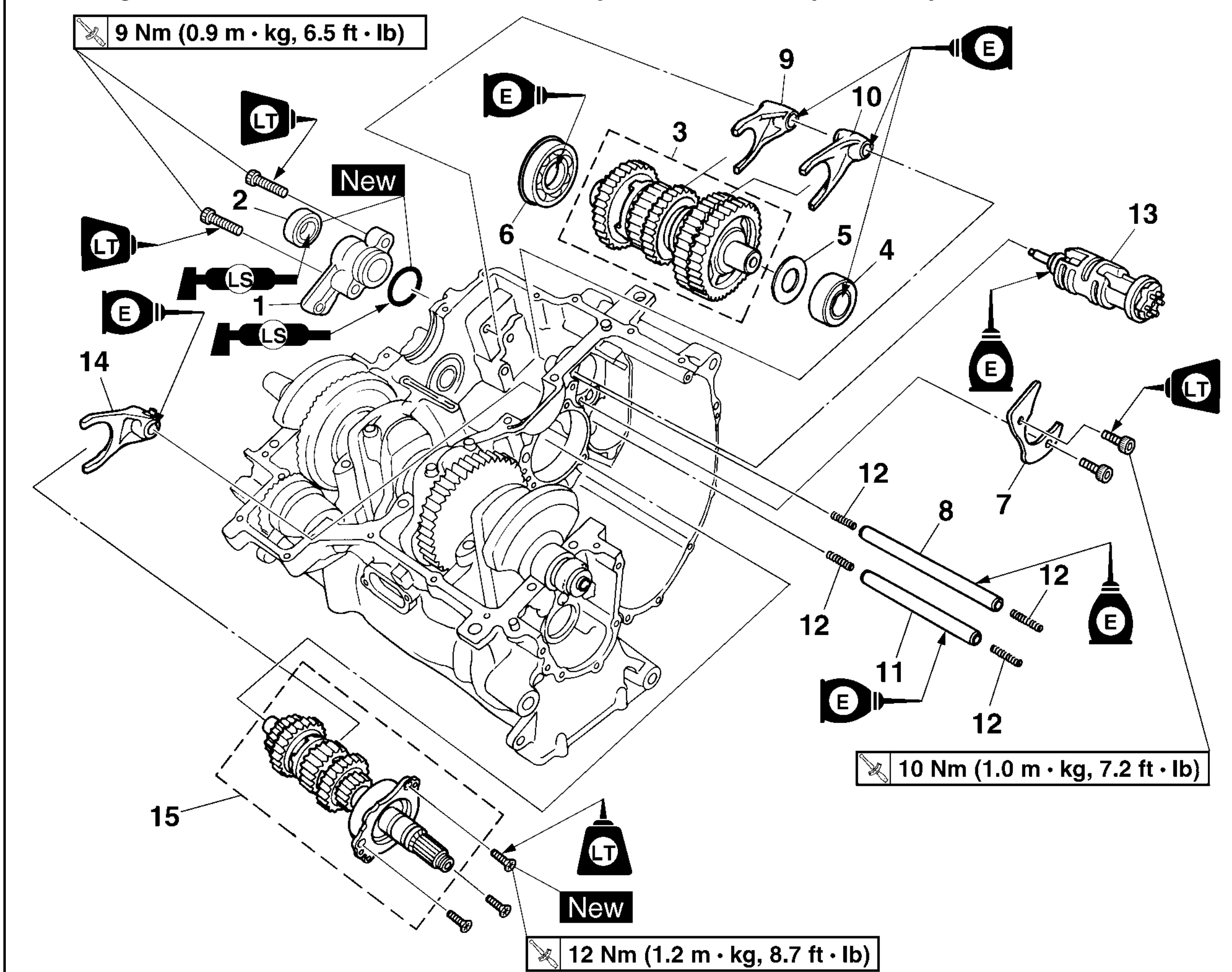
Order	Job/Parts to remove	Q'ty	Remarks
13	Main axle assembly	1	
			For installation, reverse the removal procedure.

Removing the transmission, shift drum assembly, and shift forks (FJR13AE)



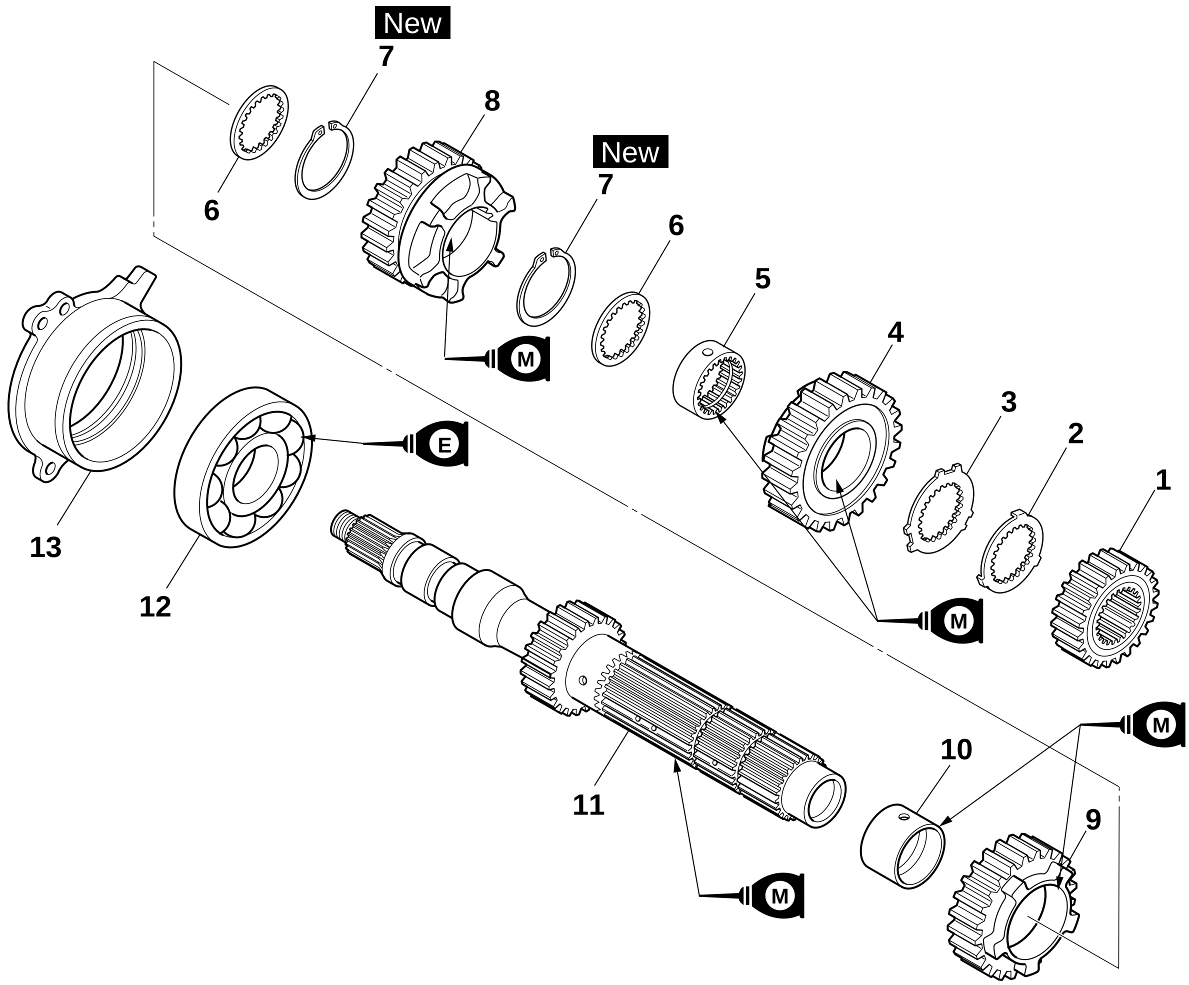
Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-101.
	Stopper lever		Refer to "SHIFT SHAFT" on page 5-79.
1	Gear position sensor bracket	1	
2	Oil seal	1	
3	Drive axle assembly	1	
4	Bearing	1	
5	Washer	1	
6	Bearing	1	
7	Shift drum retainer	1	
8	Long shift fork guide bar	1	
9	Shift fork-L	1	
10	Shift fork-R	1	
11	Short shift fork guide bar	1	
12	Spring	4	
13	Shift drum assembly	1	
14	Shift fork-C	1	

Removing the transmission, shift drum assembly, and shift forks (FJR13AE)



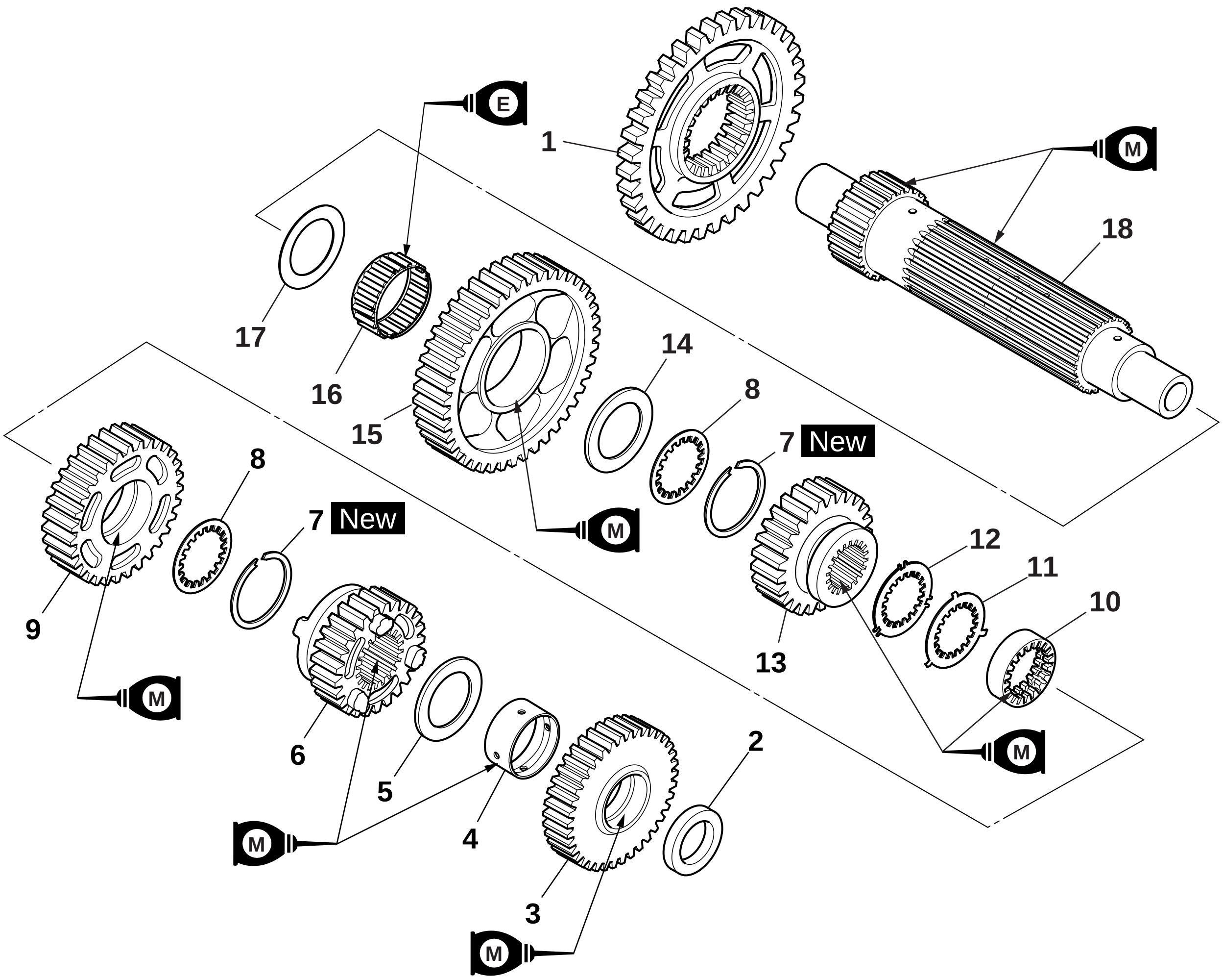
Order	Job/Parts to remove	Q'ty	Remarks
15	Main axle assembly	1	
			For installation, reverse the removal procedure.

Disassembling the main axle assembly



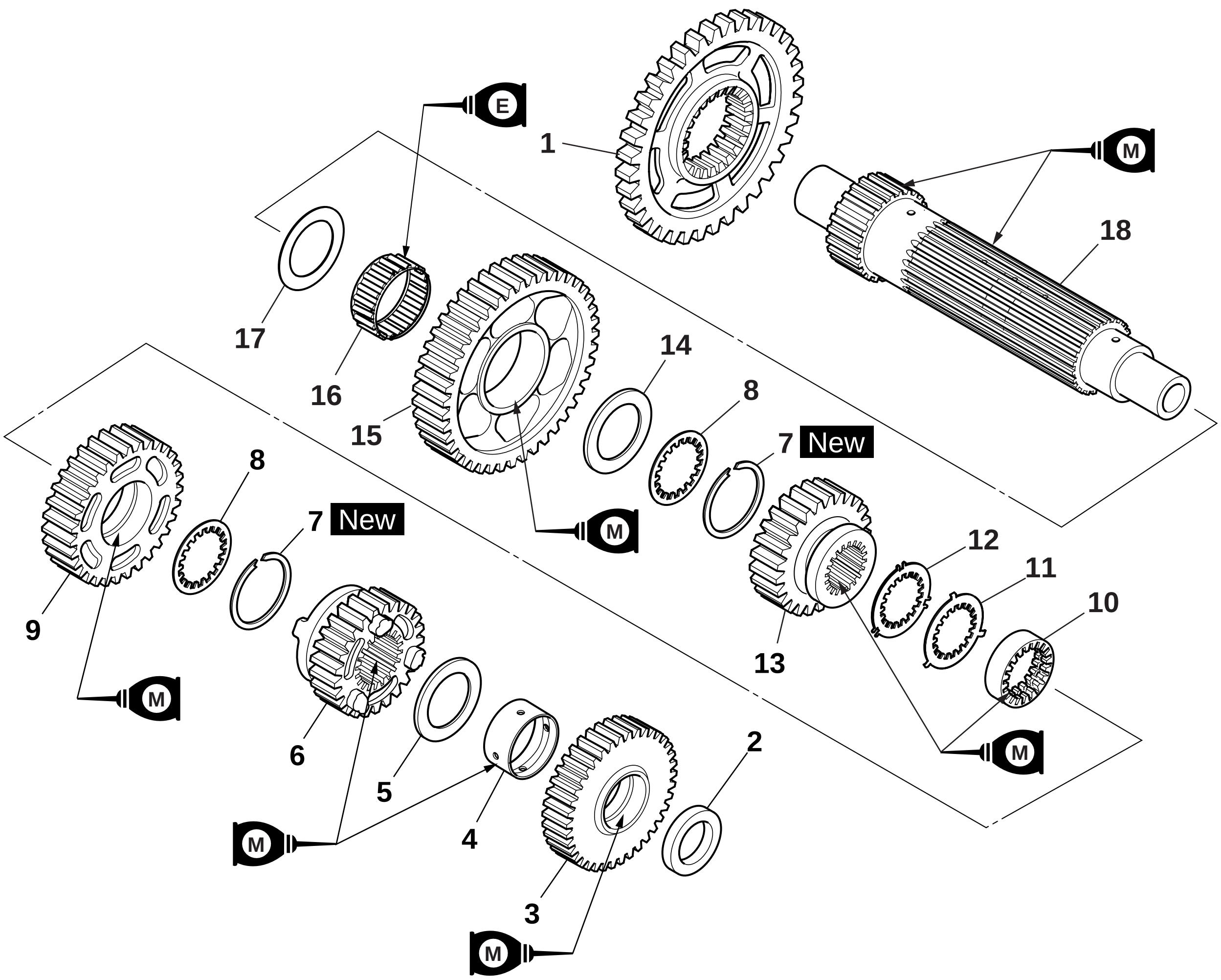
Order	Job/Parts to remove	Q'ty	Remarks
1	2nd pinion gear	1	
2	Toothed lock washer	1	
3	Toothed lock washer retainer	1	
4	5th pinion gear	1	
5	Toothed spacer	1	
6	Toothed washer	2	
7	Circlip	2	
8	3rd pinion gear	1	
9	4th pinion gear	1	
10	Collar	1	
11	Main axle/1st pinion gear	1	
12	Bearing	1	
13	Main axle bearing housing	1	
			For assembly, reverse the disassembly procedure.

Disassembling the drive axle assembly



Order	Job/Parts to remove	Q'ty	Remarks
1	Middle drive gear	1	
2	Washer	1	
3	2nd wheel gear	1	
4	Collar	1	
5	Washer	1	
6	5th wheel gear	1	
7	Circlip	2	
8	Toothed washer	2	
9	3rd wheel gear	1	
10	Toothed spacer	1	
11	Toothed lock washer	1	
12	Toothed lock washer retainer	1	
13	4th wheel gear	1	
14	Washer	1	
15	1st wheel gear	1	
16	Bearing	1	
17	Washer	1	

Disassembling the drive axle assembly



Order	Job/Parts to remove	Q'ty	Remarks
18	Drive axle	1	
			For assembly, reverse the disassembly procedure.

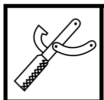
EAS26250

REMOVING THE TRANSMISSION

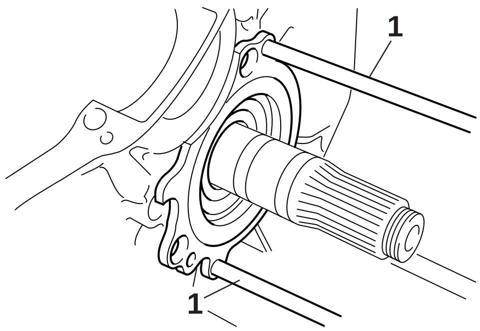
1. Remove:
   - Main axle assembly

TIP

Remove the main axle assembly with the slide hammer bolts “1” and weight.



Slide hammer bolt
90890-01083
Slide hammer bolt 6 mm
YU-01083-1
Weight
90890-01084
YU-01083-3

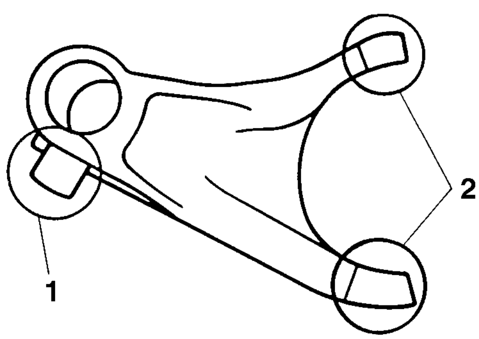


EAS26260

CHECKING THE SHIFT FORKS

The following procedure applies to all of the shift forks.

1. Check:
   - Shift fork cam follower “1”
   - Shift fork pawl “2”
   Bends/damage/scoring/wear → Replace the shift fork.

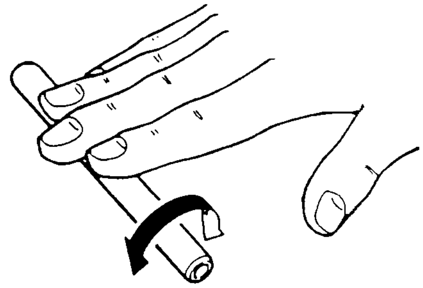


2. Check:
   - Shift fork guide bar
   Roll the shift fork guide bar on a flat surface.
   Bends → Replace.

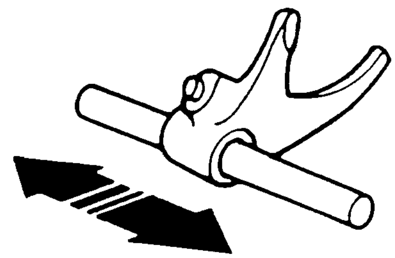
EWA12840

WARNING

Do not attempt to straighten a bent shift fork guide bar.



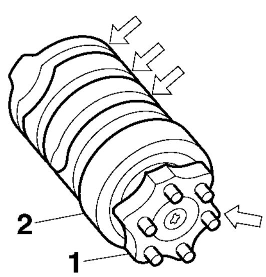
3. Check:
   - Shift fork movement
   (along the shift fork guide bar)
   Rough movement → Replace the shift forks and shift fork guide bar as a set.



EAS26270

CHECKING THE SHIFT DRUM ASSEMBLY

1. Check:
   - Shift drum groove
   Damage/scratches/wear → Replace the shift drum assembly.
   - Shift drum segment “1”
   Damage/wear → Replace the shift drum assembly.
   - Shift drum bearing “2”
   Damage/pitting → Replace the shift drum assembly.

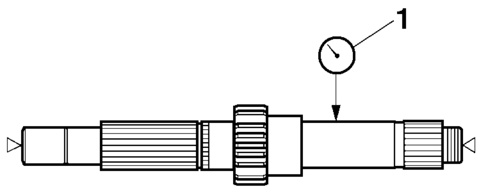


EAS26300

CHECKING THE TRANSMISSION

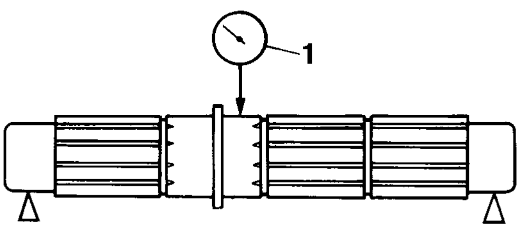
1. Measure:
   - Main axle runout
   (with a centering device and dial gauge “1”)
   Out of specification → Replace the main axle.

Main axle runout limit **0.08 mm (0.0032 in)**

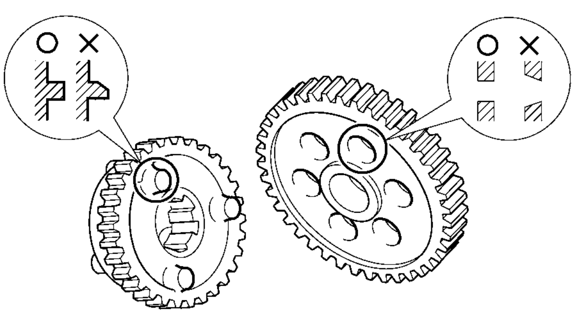


2. Measure:
   - Drive axle runout
     (with a centering device and dial gauge “1”)
     Out of specification → Replace the drive axle.

Drive axle runout limit **0.08 mm (0.0032 in)**



3. Check:
   - Transmission gears
     Blue discoloration/pitting/wear → Replace the defective gear(s).
   - Transmission gear dogs
     Cracks/damage/rounded edges → Replace the defective gear(s).



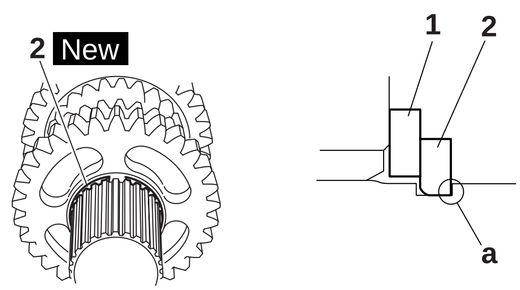
4. Check:
   - Transmission gear engagement
     (each pinion gear to its respective wheel gear)
     Incorrect → Reassemble the transmission axle assemblies.
5. Check:
   - Transmission gear movement
     Rough movement → Replace the defective part(s).
6. Check:
   - Circlips
     Bends/damage/looseness → Replace.

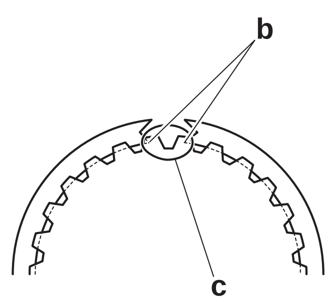
ET3P61030
ASSEMBLING THE MAIN AXLE AND DRIVE AXLE

1. Install:
   - Toothed washer “1”
   - Circlip “2” **New**

TIP

- Be sure the circlip sharp-edged corner “a” is positioned opposite side to the toothed washer and gear. (For main axle)
- Install the circlip so that both ends “b” rest on the sides of a spline “c” with both axles aligned.



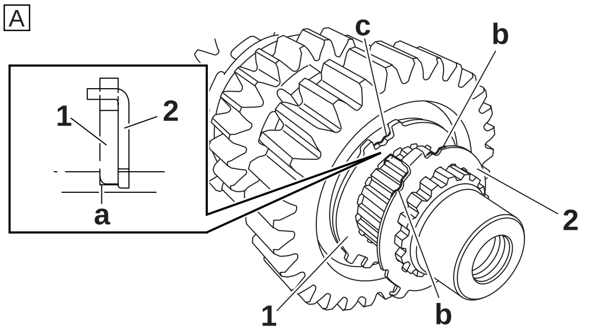


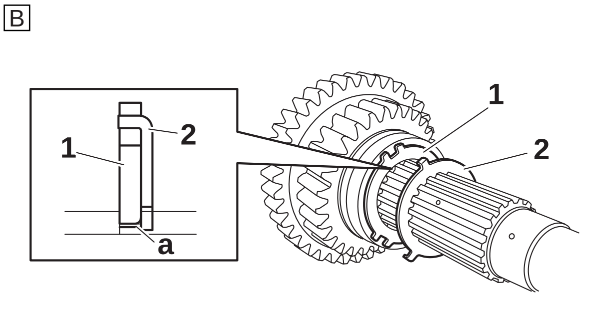
2. Install:
   - Toothed lock washer retainer “1”
   - Toothed lock washer “2”

TIP

- With the toothed lock washer retainer “1” in the groove “a” in the axle, align the projection on the retainer with an axle spline, and then install the toothed lock washer “2”.

- Be sure to align the projection on the toothed lock washer that is between the alignment marks “b” with the alignment mark “c” on the retainer.



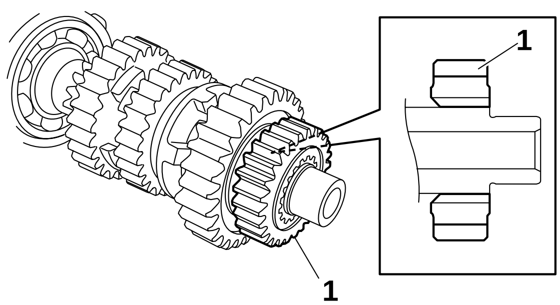


A. Main axle
B. Drive axle

3. Install:
   - 2nd pinion gear “1”

TIP

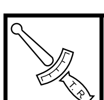
Install the 2nd pinion gear with its chamfered side facing inward as shown in the illustration.



EAS26350

INSTALLING THE TRANSMISSION (FJR13A)

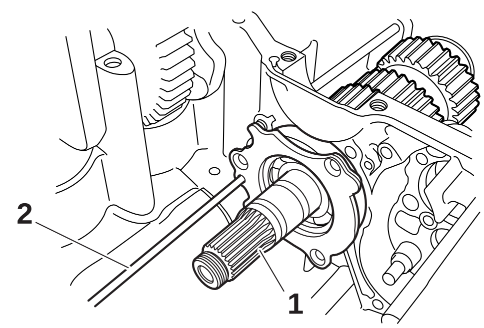
1. Install:
   - Main axle assembly “1”
   - Main axle bearing housing bolts

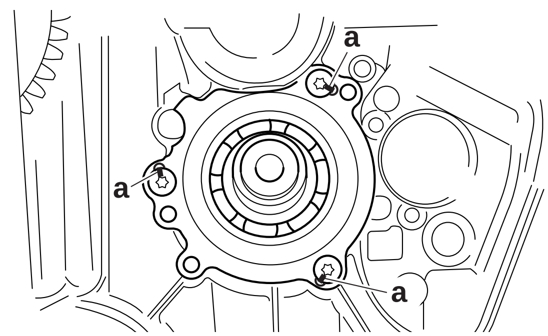


Main axle bearing housing bolt
12 Nm (1.2 m·kg, 8.7 ft·lb)
LOCTITE®

TIP

- When installing the main axle assembly, use a pin “2” to align the bearing housing hole with the corresponding hole in the upper crankcase.
- Stake the main axle bearing housing bolts at a cutout “a” in the main axle bearing housing.





2. Install:
   - Shift fork-C
   - Shift drum assembly
   - Springs
   - Short shift fork guide bar
   - Shift fork-R
   - Shift fork-L
   - Long shift fork guide bar

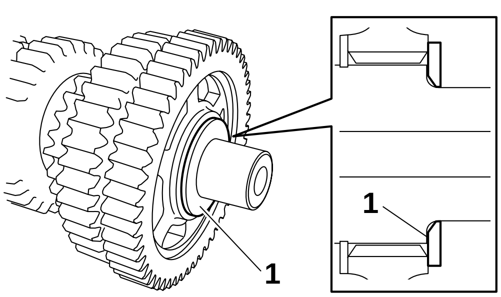
TIP

The embossed marks on the shift forks should face towards the right side of the engine and be in the following sequence: “R”, “C”, “L”.

3. Install:
   - Washer “1”

TIP

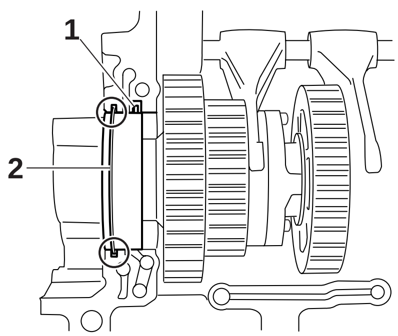
Install the washer with its chamfered side facing towards the drive axle assembly as shown in the illustration.



4. Install:
   - Drive axle assembly

TIP

- The bearing pin "1" must face towards the rear of the upper crankcase.
- Make sure the bearing circlip "2" is inserted into the groove in the upper crankcase.



5. Check:
   - Transmission
     Rough movement → Repair.

TIP

Oil each gear, shaft, and bearing thoroughly.

ET3P6D001

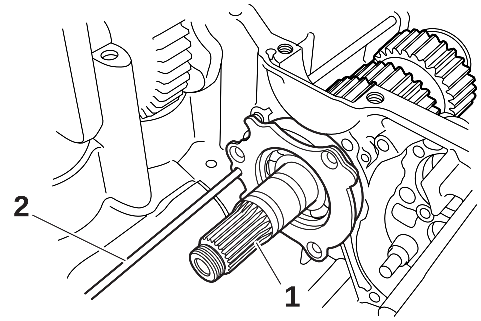
INSTALLING THE TRANSMISSION (FJR13AE)

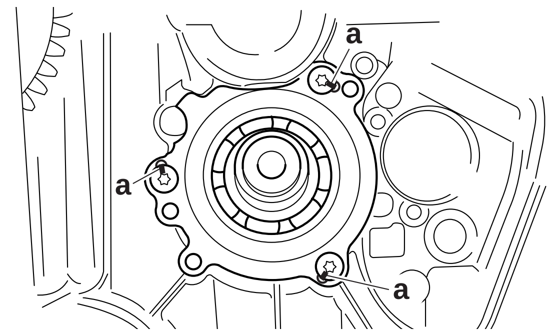
1. Install:
   - Main axle assembly "1"
   - Main axle bearing housing bolts

Main axle bearing housing bolt
12 Nm (1.2 m·kg, 8.7 ft·lb)
LOCTITE®

TIP

- When installing the main axle assembly, use a pin "2" to align the bearing housing hole with the corresponding hole in the upper crankcase.
- Stake the main axle bearing housing bolts at a cutout "a" in the main axle bearing housing.





2. Install:
   - Shift fork-C
   - Shift drum assembly
   - Springs
   - Short shift fork guide bar
   - Shift fork-R
   - Shift fork-L
   - Long shift fork guide bar

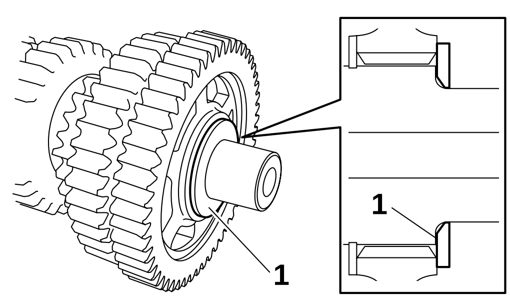
TIP

The embossed marks on the shift forks should face towards the right side of the engine and be in the following sequence: "R", "C", "L".

3. Install:
   - Washer "1"

TIP

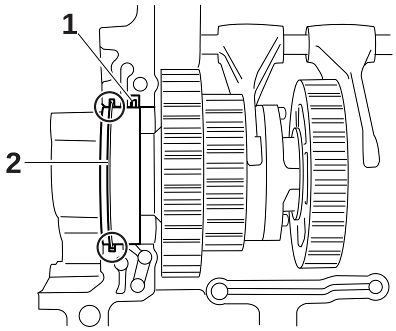
Install the washer with its chamfered side facing towards the drive axle assembly as shown in the illustration.



4. Install:
   - Drive axle assembly

TIP

- The bearing pin “1” must face towards the rear of the upper crankcase.
- Make sure the bearing circlip “2” is inserted into the groove in the upper crankcase.



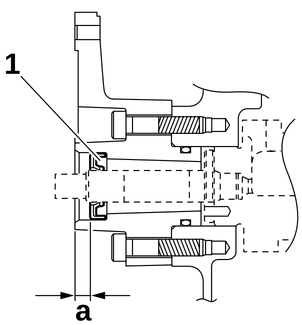
5. Check:
   - Transmission
     Rough movement → Repair.

TIP

Oil each gear, shaft, and bearing thoroughly.

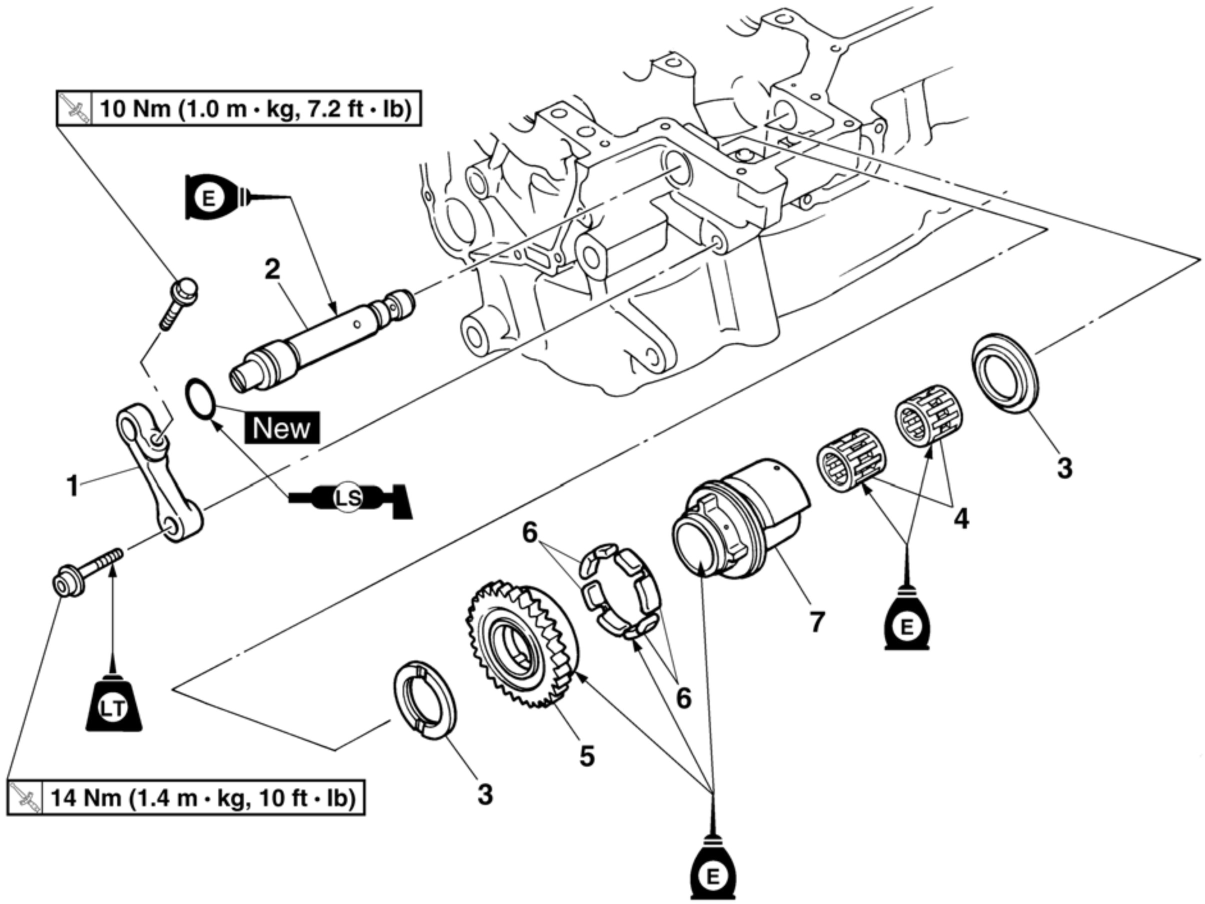
6. Install:
   - Oil seal “1”
     (to gear position sensor bracket)

Installed depth “a”
4.2–4.7 mm (0.17–0.19 in)



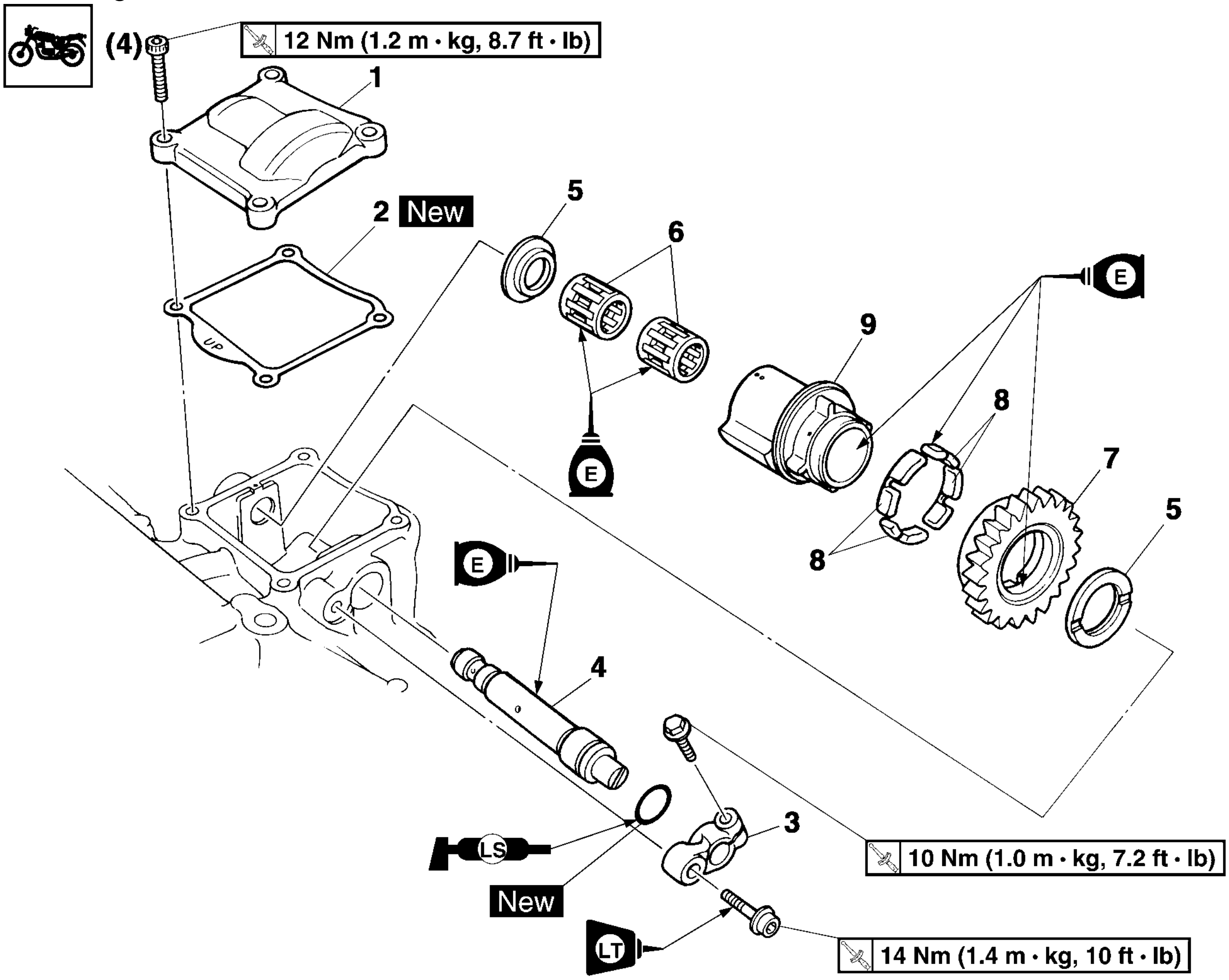
ET3P61031
BALANCERS

Removing the front balancer



Order	Job/Parts to remove	Q'ty	Remarks
	Crankcase		Separate. Refer to "CRANKCASE" on page 5-101.
1	Front balancer lever	1	
2	Front balancer shaft	1	
3	Washer	2	
4	Bearing	2	
5	Front balancer gear	1	
6	Damper	4	
7	Front balancer weight	1	
			For installation, reverse the removal procedure.

Removing the rear balancer



Order	Job/Parts to remove	Q'ty	Remarks
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-5.
	Pickup rotor cover		Refer to "PICKUP ROTOR" on page 5-39.
	Clutch cover		Refer to "CLUTCH" on page 5-46.
1	Rear balancer cover	1	
2	Rear balancer cover gasket	1	
3	Rear balancer lever	1	
4	Rear balancer shaft	1	
5	Washer	2	
6	Bearing	2	
7	Rear balancer gear	1	
8	Damper	4	
9	Rear balancer weight	1	
			For installation, reverse the removal procedure.

EAS26120

CHECKING THE BALANCERS

1. Check:
   - Front balancer gear
     Damage/wear → Replace the front balancer gear and crankshaft.
   - Rear balancer gear
     Damage/wear → Replace the rear balancer gear and clutch housing.
2. Check:
   - Balancer shafts
     Cracks/damage/wear → Replace the balancer shaft and bearings.
     Dirt → Clean.
   - Bearings
     Damage/wear → Replace.
   - Dampers
     Damage/wear → Replace.

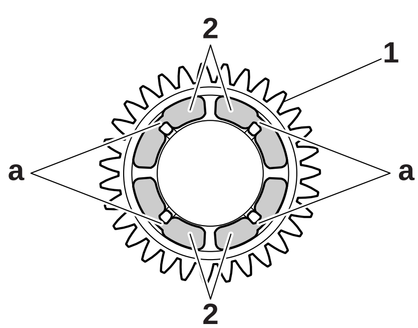
ET3P61032

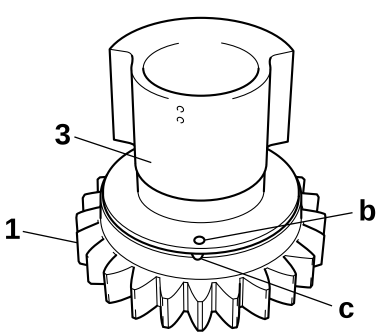
INSTALLING THE FRONT BALANCER

1. Install:
   - Front balancer gear “1”
   - Dampers “2”
   - Front balancer weight “3”
   - Bearings
   - Washers

TIP

- Install the dampers onto the balancer gear so that the middle section “a” of each damper is positioned to the outside of the gear projections as shown in the illustration.
- Align the punch mark “b” in the balancer weight with the mark “c” in the balancer gear.

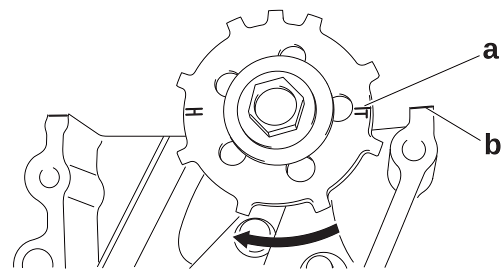




2. Align:
   - “T” mark on the pickup rotor
     (with the crankcase mating surface)

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a. Turn the crankshaft clockwise.
b. When piston #1 is at TDC on the compression stroke, align the “T” mark “a” on the pickup rotor with the crankcase mating surface “b”.



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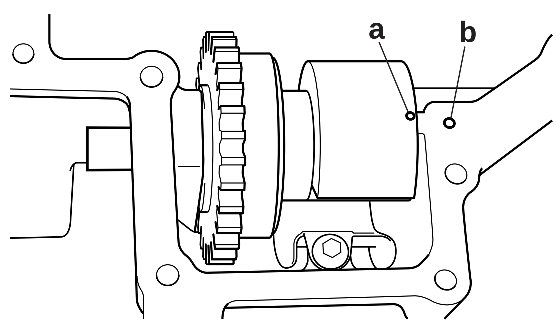
3. Install:
   - Front balancer shaft

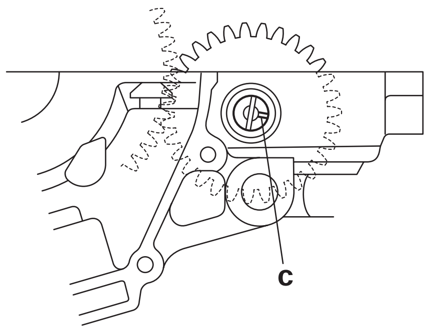
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a. Align the punch mark “a” in the balancer weight with the oil hole “b” in the upper crankcase.

TIP

- Make sure that the front balancer gear teeth and the balancer drive gear teeth mesh correctly.
- Make sure that the slot “c” is facing in the direction indicated in the illustration when installing the balancer shaft.



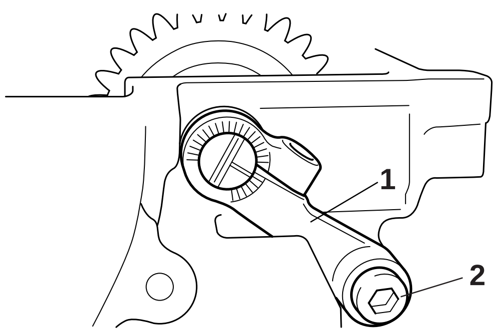


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4. Install:
   - Front balancer lever “1”
   - Front balancer lever bolt “2”

TIP

- Apply locking agent (LOCTITE®) to the threads of the balancer lever bolt.
- Temporarily tighten the balancer lever bolt.

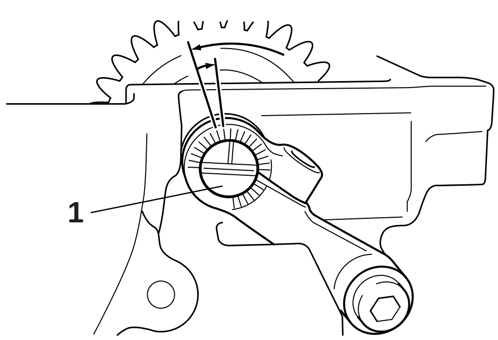


5. Tighten:
   - Front balancer shaft “1”

Front balancer shaft
0.4 Nm (0.04 m·kg, 0.29 ft·lb)

TIP

Tighten the balancer shaft to the specified torque by turning it counterclockwise, and then turn it one mark back on the balancer lever scale.

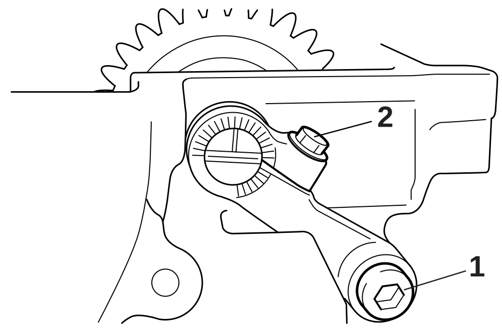


6. Tighten:
   - Front balancer lever bolt “1”
   - Front balancer shaft pinch bolt “2”

Front balancer lever bolt
14 Nm (1.4 m·kg, 10 ft·lb)
Front balancer shaft pinch bolt
10 Nm (1.0 m·kg, 7.2 ft·lb)

TIP

Make sure that the balancer shaft does not rotate.



7. Start the engine and check that there is no abnormal noise coming from the balancer gear. If noise is abnormal, adjust the gear lash by turning the balancer shaft.

TIP

With each adjustment, turn the balancer shaft one scale.

Clockwise	Gear lash decreased
Counterclockwise	Gear lash increased

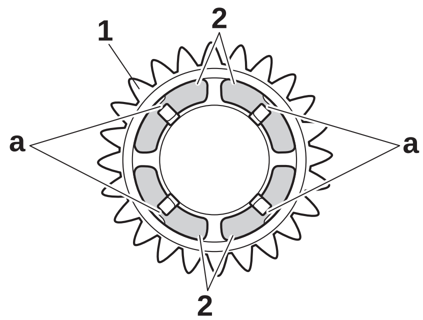
ET3P61033

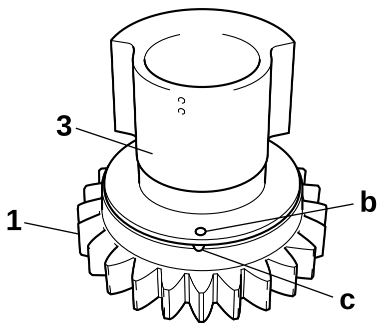
INSTALLING THE REAR BALANCER

1. Install:
   - Rear balancer gear “1”
   - Dampers “2”
   - Rear balancer weight “3”
   - Bearings
   - Washers

TIP

- Install the dampers onto the balancer gear so that the middle section “a” of each damper is positioned to the outside of the gear projections as shown in the illustration.
- Align the punch mark “b” in the balancer weight with the mark “c” in the balancer gear.





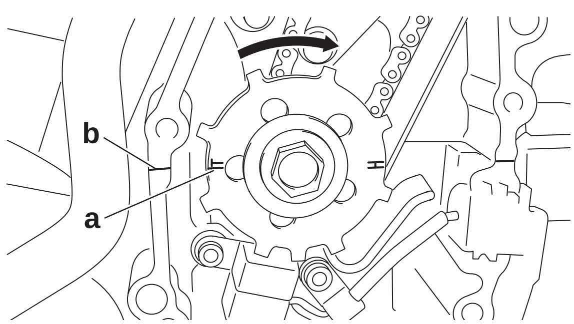
2. Align:
   - “T” mark on the pickup rotor
     (with the crankcase mating surface)

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a. Turn the crankshaft clockwise.
b. When piston #1 is at TDC on the compression stroke, align the “T” mark “a” on the pickup rotor with the crankcase mating surface “b”.

TIP

TDC on the compression stroke can be found when the camshaft lobes are turned away from each other.

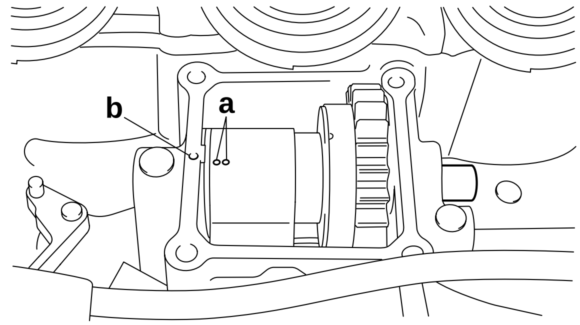


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3. Install:
   - Rear balancer shaft

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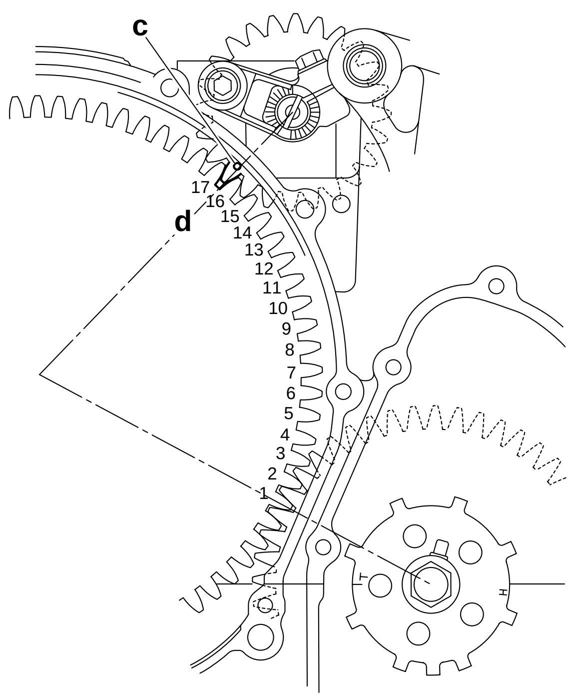
a. Align the punch marks “a” in the balancer weight with the punch mark “b” in the upper crankcase.

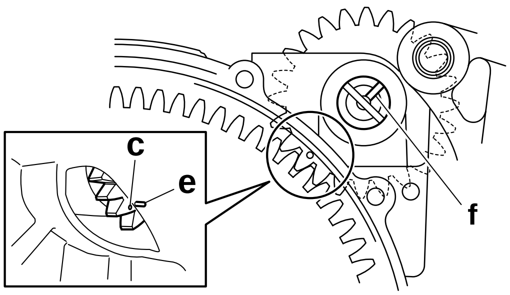


b. Align the balancer gear punch mark “c” with the primary driven gear point “d” as shown.

TIP

- Make sure that the rear balancer gear teeth and the primary driven gear teeth mesh correctly.
- Make sure that the balancer gear punch mark “c” is aligned with the projection “e” on the upper crankcase.
- Make sure that the slot “f” is facing in the direction indicated in the illustration when installing the balancer shaft.



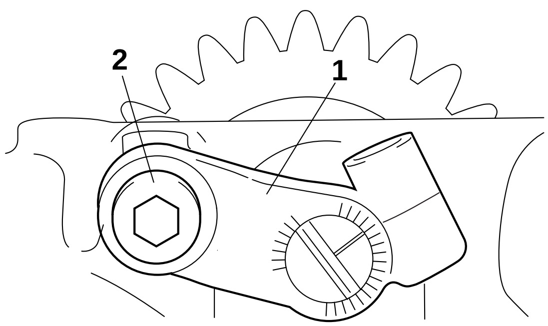


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4. Install:
   - Rear balancer lever “1”
   - Rear balancer lever bolt “2”

TIP

- Apply locking agent (LOCTITE®) to the threads of the balancer lever bolt.
- Temporarily tighten the balancer lever bolt.

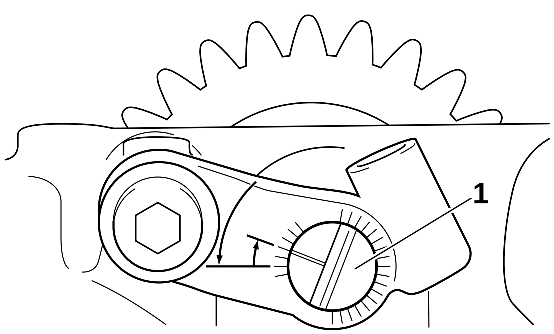


5. Tighten:
   - Rear balancer shaft “1”

Rear balancer shaft
0.4 Nm (0.04 m·kg, 0.29 ft·lb)

TIP

Tighten the balancer shaft to the specified torque by turning it counterclockwise, and then turn it two marks back on the balancer lever scale.

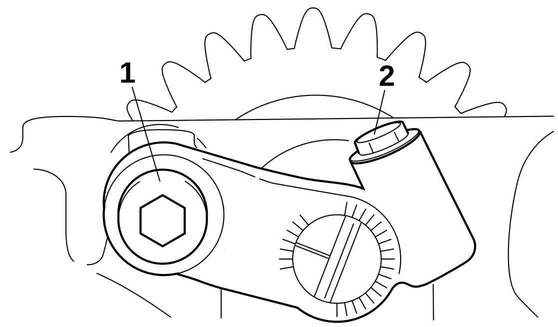


6. Tighten:
   - Rear balancer lever bolt “1”
   - Rear balancer shaft pinch bolt “2”

Rear balancer lever bolt
14 Nm (1.4 m·kg, 10 ft·lb)
Rear balancer shaft pinch bolt
10 Nm (1.0 m·kg, 7.2 ft·lb)

TIP

Make sure that the balancer shaft does not rotate.



7. Start the engine and check that there is no abnormal noise coming from the balancer gear. If noise is abnormal, adjust the gear lash by turning the balancer shaft.

TIP

With each adjustment, turn the balancer shaft one scale.

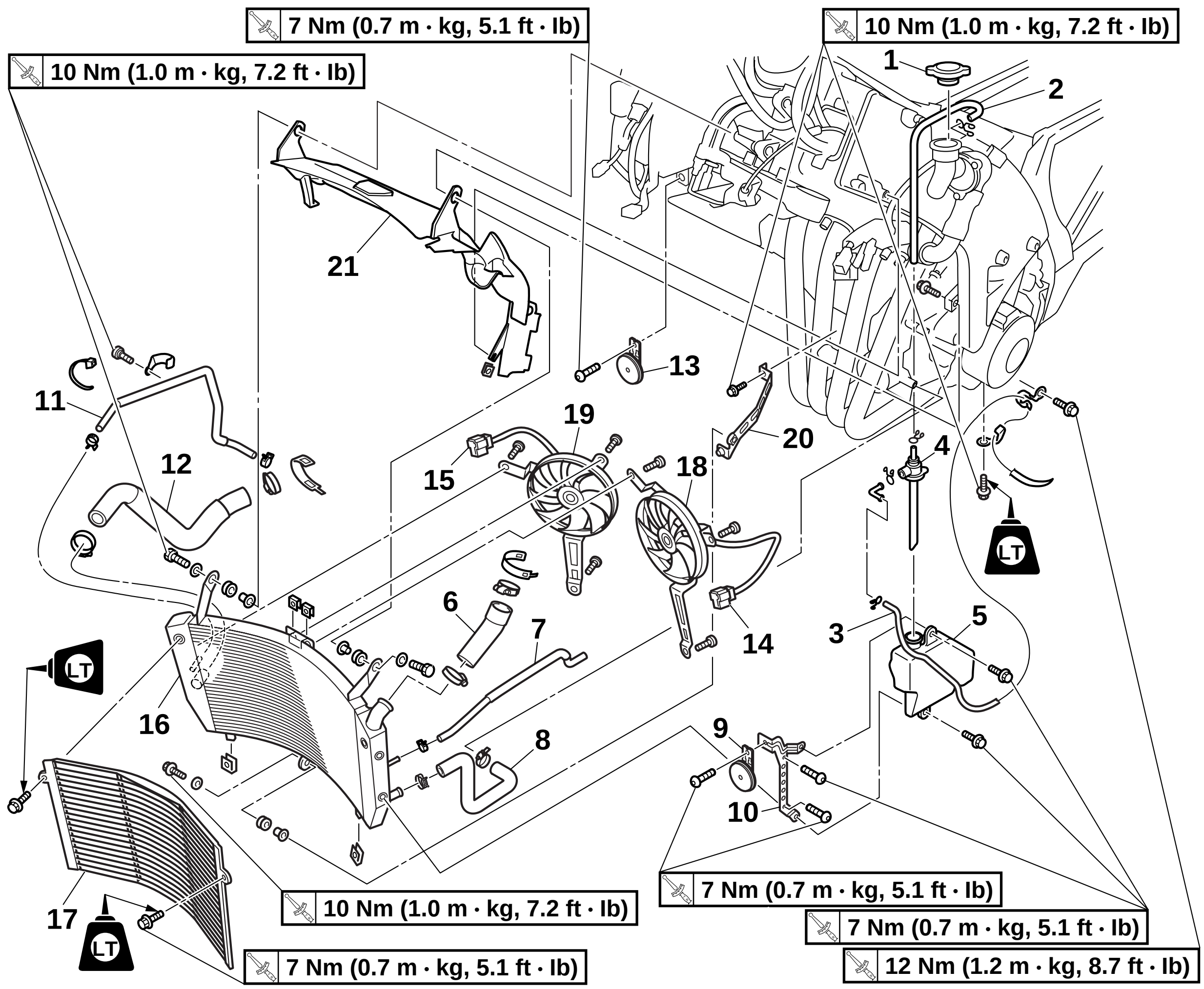
Clockwise	Gear lash decreased
Counterclockwise	Gear lash increased

COOLING SYSTEM

EAS26380

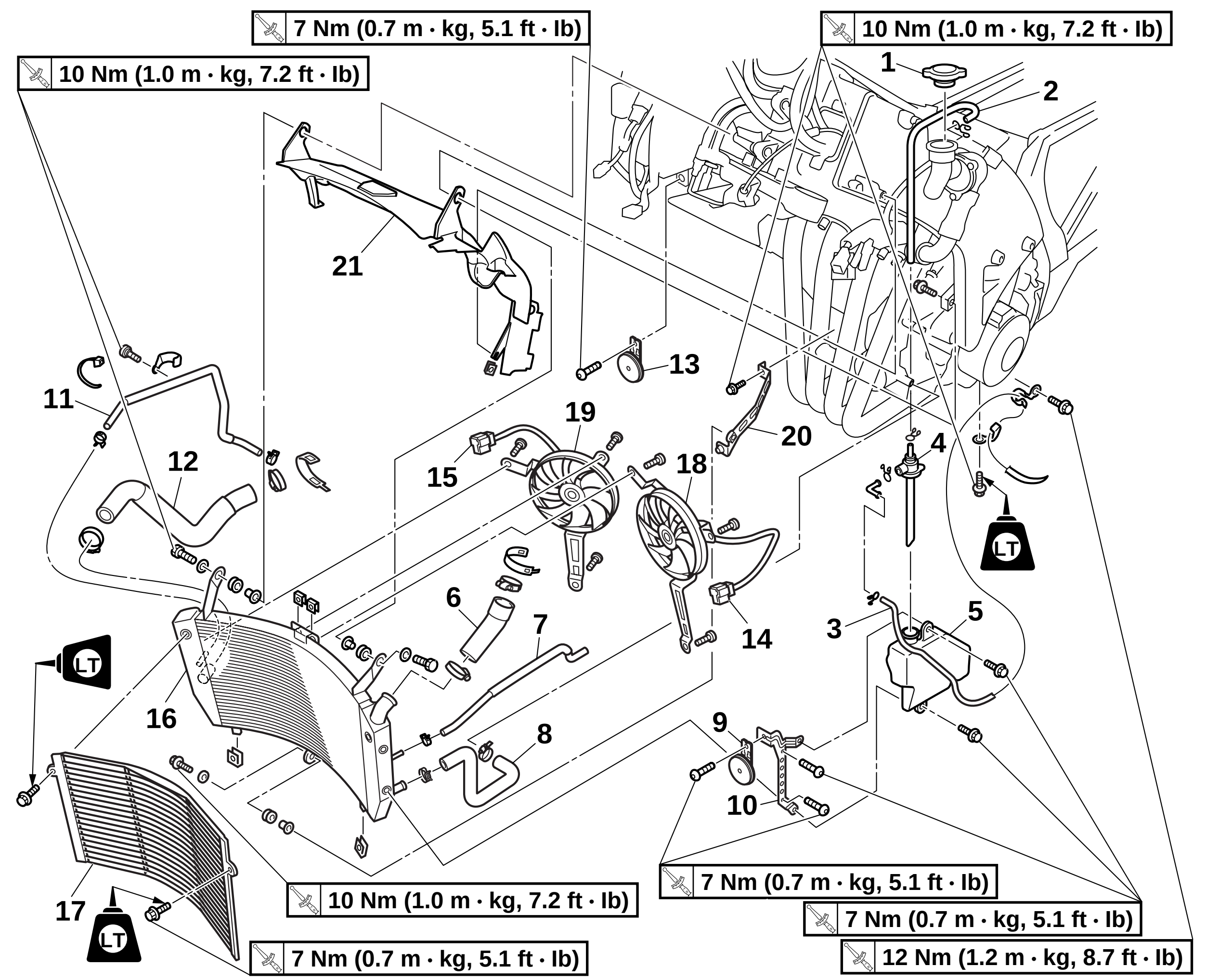
RADIATOR

Removing the radiator



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-25.
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-5.
1	Radiator cap	1	
2	Coolant reservoir hose	1	
3	Coolant reservoir breather hose	1	
4	Coolant reservoir cap	1	
5	Coolant reservoir	1	
6	Radiator inlet hose	1	
7	Plunger control unit hose 2	1	
8	Oil cooler outlet hose	1	
9	Left horn (low)	1	
10	Coolant reservoir bracket	1	
11	Water pump breather hose	1	
12	Radiator outlet hose	1	
13	Right horn (high)	1	

Removing the radiator



Order	Job/Parts to remove	Q'ty	Remarks
14	Left radiator fan motor coupler	1	Disconnect.
15	Right radiator fan motor coupler	1	Disconnect.
16	Radiator	1	
17	Radiator cover	1	
18	Left radiator fan motor	1	
19	Right radiator fan motor	1	
20	Radiator bracket	1	
21	Air deflector	1	
			For installation, reverse the removal procedure.

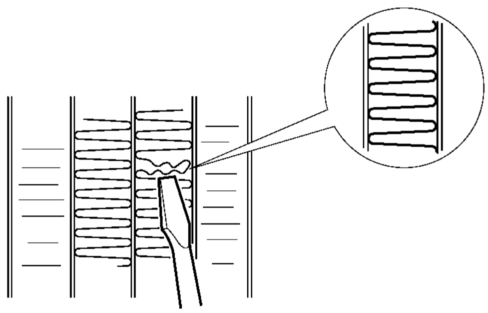
EAS26390

CHECKING THE RADIATOR

1. Check:
   - Radiator fins
     Obstruction → Clean.
     Apply compressed air to the rear of the radiator.
     Damage → Repair or replace.

TIP

Straighten any flattened fins with a thin, flat-head screwdriver.



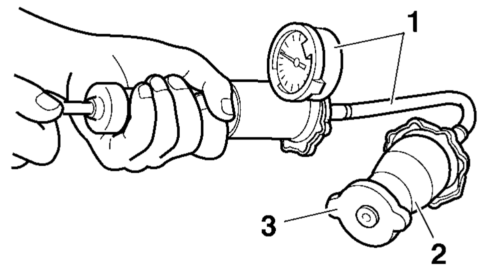
2. Check:
   - Radiator hoses
   - Radiator pipes
     Cracks/damage → Replace.
3. Measure:
   - Radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.

Radiator cap opening pressure
93.3–122.7 kPa (13.5–17.8 psi) (0.93–1.23 kgf/cm²)

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a. Install the radiator cap tester “1” and radiator cap tester adapter “2” to the radiator cap “3”.

Radiator cap tester
90890-01325
Radiator pressure tester
YU-24460-01
Radiator cap tester adapter
90890-01352
Radiator pressure tester adapter
YU-33984



b. Apply the specified pressure for ten seconds and make sure there is no drop in pressure.

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4. Check:
   - Radiator fan
     Damage → Replace.
     Malfunction → Check and repair.
     Refer to “COOLING SYSTEM” on page 8-53.

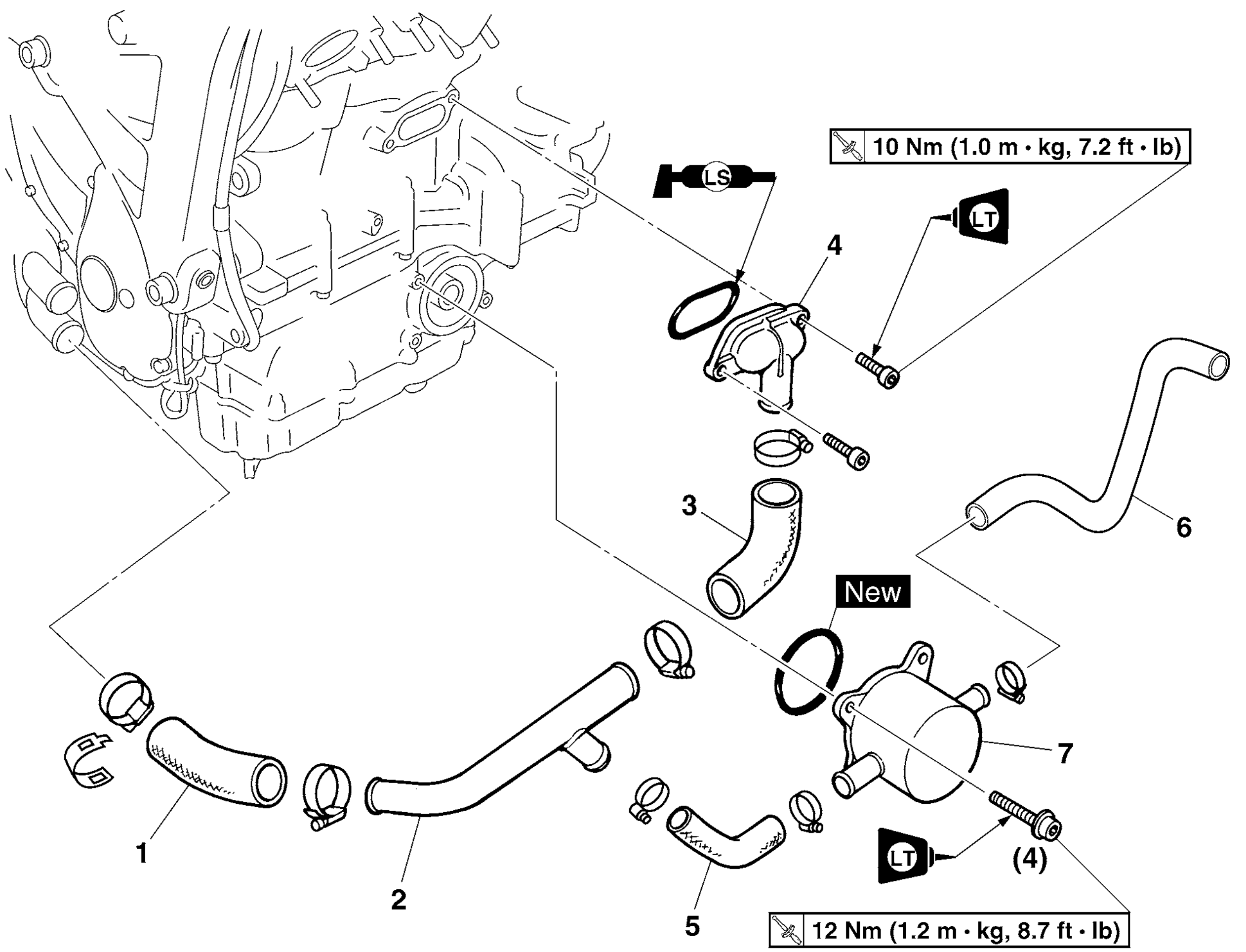
EAS26400

INSTALLING THE RADIATOR

1. Fill:
   - Cooling system
     (with the specified amount of the recommended coolant)
     Refer to “CHANGING THE COOLANT” on page 3-25.
2. Check:
   - Cooling system
     Leaks → Repair or replace any faulty part.
3. Measure:
   - Radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.
     Refer to “CHECKING THE RADIATOR” on page 6-3.

EAS26410
OIL COOLER

Removing the oil cooler



Order	Job/Parts to remove	Q'ty	Remarks
	Engine oil		Drain. Refer to "CHANGING THE ENGINE OIL" on page 3-15.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-25.
	Radiator		Refer to "RADIATOR" on page 6-1.
	Exhaust pipe assembly		Refer to "ENGINE REMOVAL" on page 5-1.
1	Water pump outlet hose	1	
2	Water pump outlet pipe	1	
3	Water jacket joint inlet hose	1	
4	Water jacket joint	1	
5	Oil cooler inlet hose	1	
6	Oil cooler outlet hose	1	
7	Oil cooler	1	
			For installation, reverse the removal procedure.

EAS26420

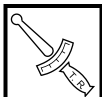
CHECKING THE OIL COOLER

1. Check:
   - Oil cooler
     Cracks/damage → Replace.
2. Check:
   - Oil cooler inlet hose
   - Oil cooler outlet hose
   - Water pump outlet hose
   - Water pump outlet pipe
   - Water jacket joint inlet hose
     Cracks/damage/wear → Replace.

EAS26430

INSTALLING THE OIL COOLER

1. Clean:
   - Mating surfaces of the oil cooler and the crankcase
     (with a cloth dampened with lacquer thinner)
2. Install:
   - O-ring New
   - Oil cooler



Oil cooler bolt
12 Nm (1.2 m·kg, 8.7 ft·lb)
LOCTITE®

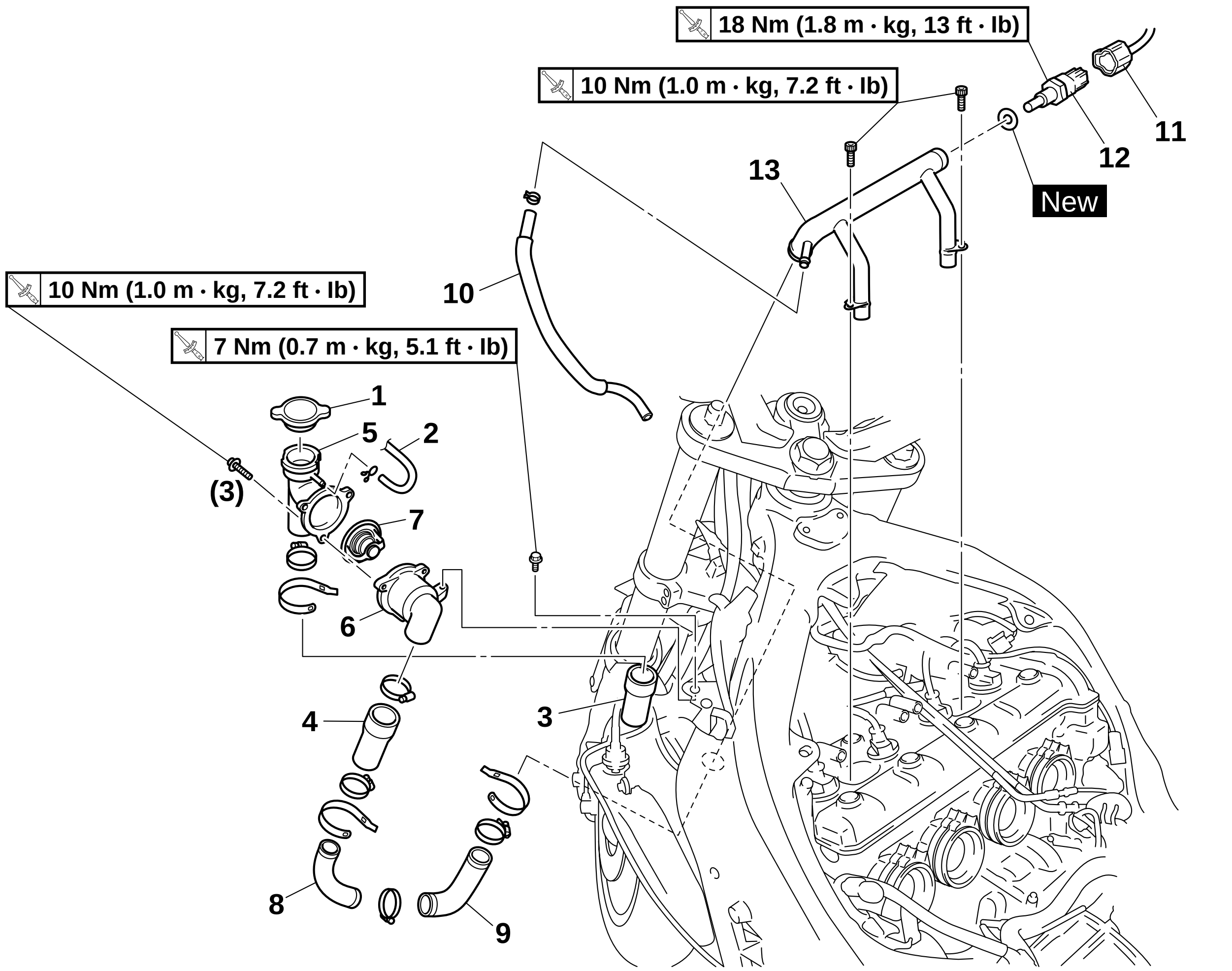
TIP

Make sure the O-ring is positioned properly.

3. Fill:
   - Cooling system
     (with the specified amount of the recommended coolant)
     Refer to “CHANGING THE COOLANT” on page 3-25.
   - Crankcase
     (with the specified amount of the recommended engine oil)
     Refer to “CHANGING THE ENGINE OIL” on page 3-15.
4. Check:
   - Cooling system
     Leaks → Repair or replace any faulty part.
5. Measure:
   - Radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.
     Refer to “CHECKING THE RADIATOR” on page 6-3.

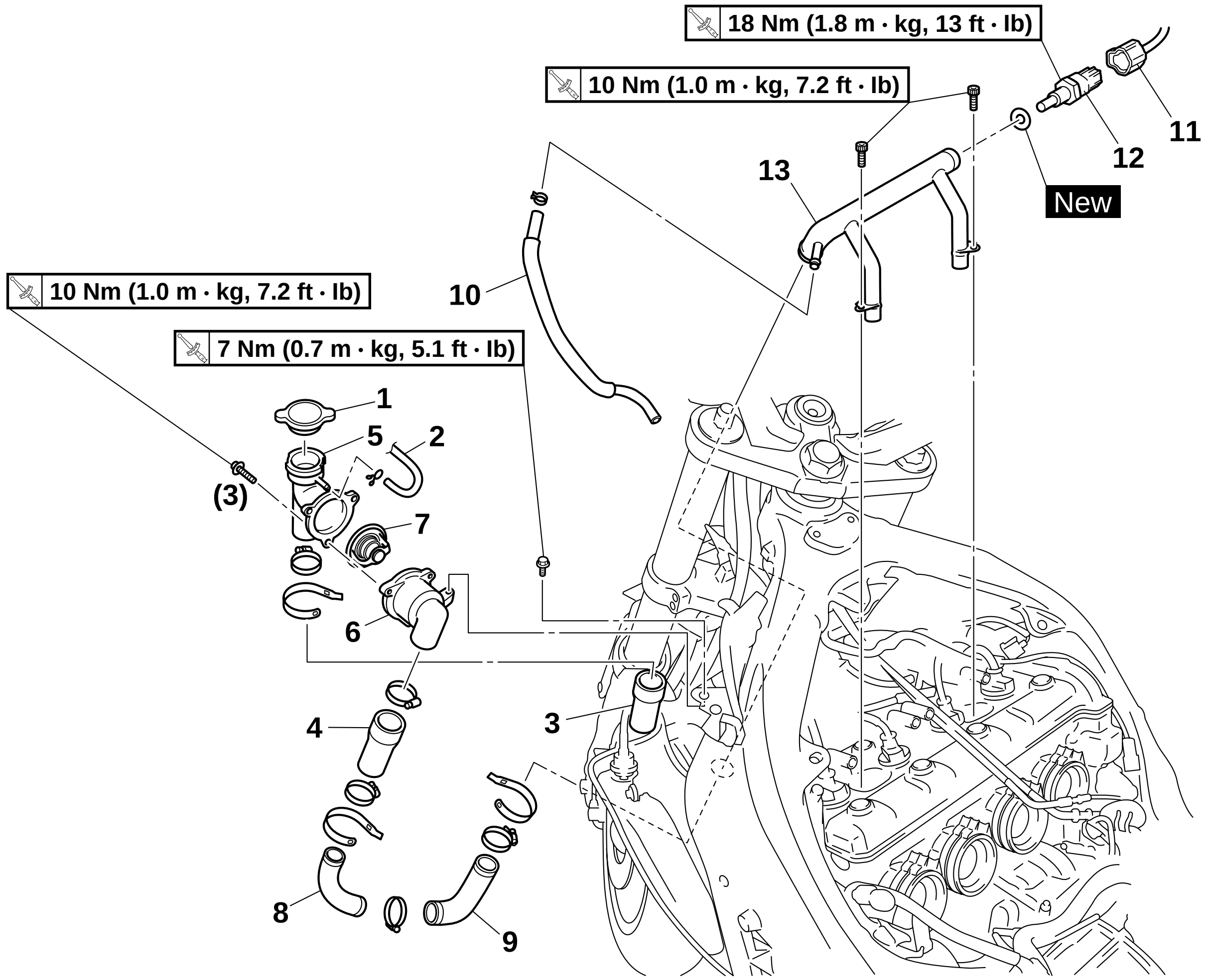
EAS26440
THERMOSTAT

Removing the thermostat assembly



Order	Job/Parts to remove	Q'ty	Remarks
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-25.
	Throttle bodies		Refer to "THROTTLE BODIES" on page 7-5.
1	Radiator cap	1	
2	Coolant reservoir hose	1	Disconnect.
3	Radiator inlet hose	1	Disconnect.
4	Thermostat inlet hose 2	1	
5	Thermostat cover/radiator filler pipe	1	
6	Thermostat housing	1	
7	Thermostat	1	
8	Thermostat inlet pipe 2	1	
9	Thermostat inlet hose 1	1	
10	Plunger control unit hose 1	1	
11	Coolant temperature sensor coupler	1	Disconnect.
12	Coolant temperature sensor	1	

Removing the thermostat assembly

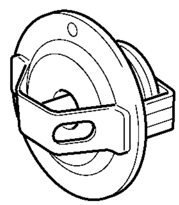


Order	Job/Parts to remove	Q'ty	Remarks
13	Thermostat inlet pipe 1	1	
			For installation, reverse the removal procedure.

EAS26450

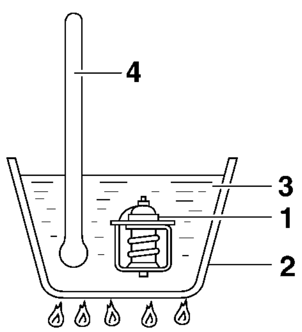
CHECKING THE THERMOSTAT

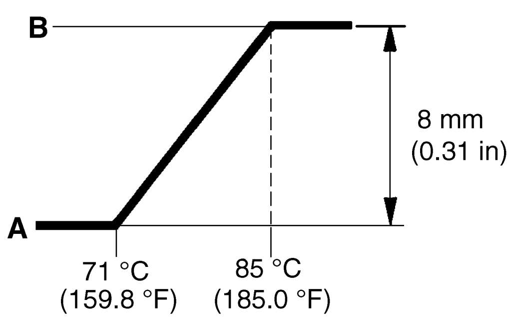
1. Check:
   - Thermostat
     Does not open at 71–85 °C (159.8–185.0 °F)
     → Replace.



▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Suspend the thermostat “1” in a container “2” filled with water.
b. Slowly heat the water “3”.
c. Place a thermometer “4” in the water.
d. While stirring the water, observe the thermostat and thermometer’s indicated temperature.





A. Fully closed
B. Fully open

TIP

If the accuracy of the thermostat is in doubt, replace it. A faulty thermostat could cause serious overheating or overcooling.

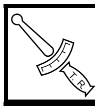
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2. Check:
   - Thermostat housing
     Cracks/damage → Replace.
3. Check:
   - Thermostat hoses
   - Thermostat pipes
   - Radiator inlet hose
   - Thermostat cover/radiator filler pipe
   - Plunger control unit hose 1
     Cracks/damage/wear → Replace.

EAS26490

INSTALLING THE THERMOSTAT ASSEMBLY

1. Install:
   - Copper washer **New**
   - Coolant temperature sensor



Coolant temperature sensor
18 Nm (1.8 m·kg, 13 ft·lb)

EC3P61019

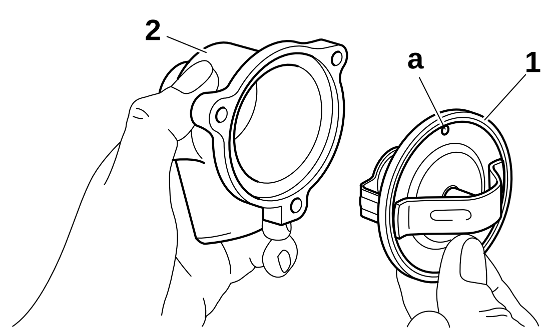
NOTICE

Use extreme care when handling the coolant temperature sensor. Replace any part that was dropped or subjected to a strong impact.

2. Install:
   - Thermostat “1”
   - Thermostat housing “2”

TIP

Install the thermostat with its breather hole “a” facing up.

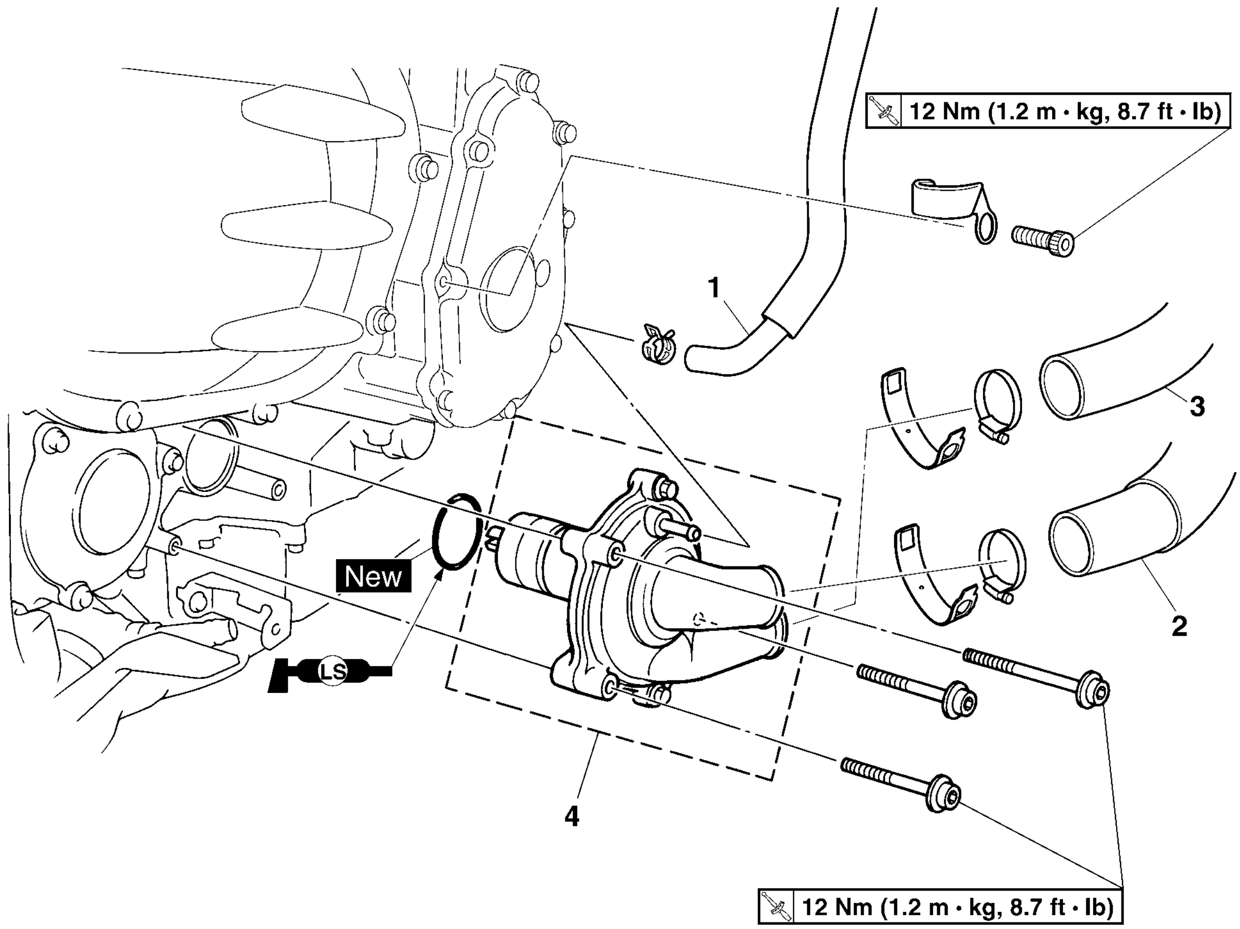


3. Fill:
   - Cooling system
     (with the specified amount of the recommended coolant)
     Refer to “CHANGING THE COOLANT” on page 3-25.
4. Check:
   - Cooling system
     Leaks → Repair or replace any faulty part.

5. Measure:
   - Radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.
     Refer to “CHECKING THE RADIATOR” on page 6-3.

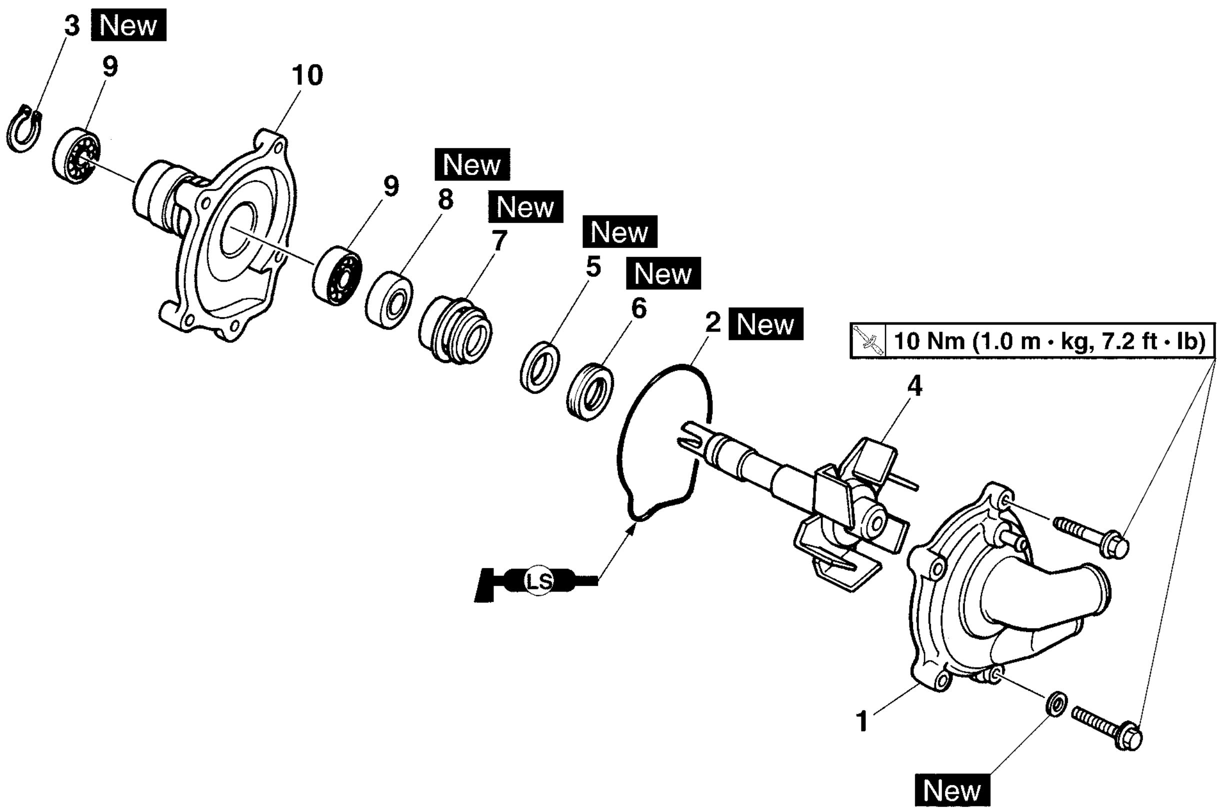
EAS26500
WATER PUMP

Removing the water pump



Order	Job/Parts to remove	Q'ty	Remarks
			It is not necessary to remove the water pump unless the coolant level is extremely low or the coolant contains engine oil.
	Right side cowling		Refer to "GENERAL CHASSIS" on page 4-1.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-25.
1	Water pump breather hose	1	Disconnect.
2	Radiator outlet hose	1	Disconnect.
3	Water pump outlet hose	1	Disconnect.
4	Water pump assembly	1	
			For installation, reverse the removal procedure.

Disassembling the water pump



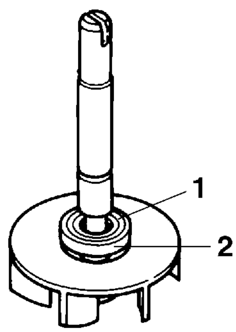
Order	Job/Parts to remove	Q'ty	Remarks
1	Water pump housing cover	1	
2	O-ring	1	
3	Circlip	1	
4	Impeller shaft	1	
5	Rubber damper holder	1	
6	Rubber damper	1	
7	Water pump seal	1	
8	Oil seal	1	
9	Bearing	2	
10	Water pump housing	1	
			For assembly, reverse the disassembly procedure.

EAS26510
DISASSEMBLING THE WATER PUMP

1. Remove:
   - Rubber damper holder “1”
   - Rubber damper “2”
     (from the impeller, with a thin, flat-head screwdriver)

TIP

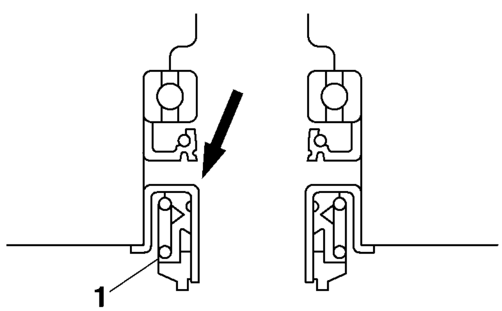
Do not scratch the impeller shaft.



2. Remove:
   - Water pump seal “1”

TIP

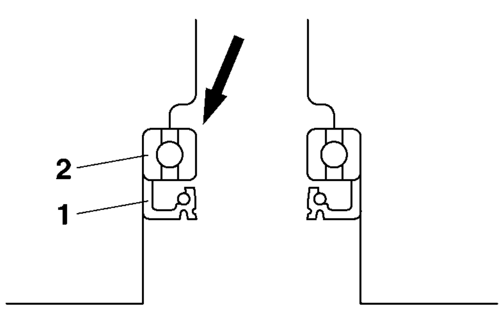
Remove the water pump seal from the inside of the water pump housing.



3. Remove:
   - Oil seal “1”
   - Bearing “2”

TIP

Remove the bearing and oil seal from the inside of the water pump housing.



EAS26540
CHECKING THE WATER PUMP

1. Check:
   - Water pump housing cover
   - Water pump housing
   - Impeller shaft
     Cracks/damage/wear → Replace.
2. Check:
   - Bearing
     Rough movement → Replace.

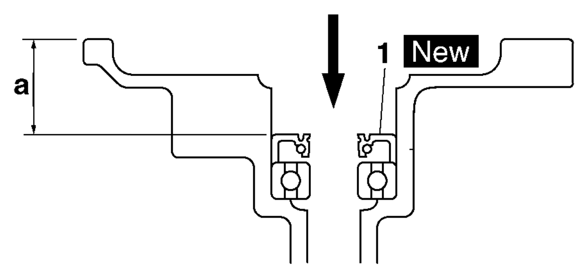
EAS26560
ASSEMBLING THE WATER PUMP

1. Install:
   - Oil seal “1” New
     (into the water pump housing)

TIP

- Before installing the oil seal, apply tap water or coolant onto its outer surface.
- Install the oil seal with a socket that matches its outside diameter.

Installed depth of oil seal “a”
20.7–21.2 mm (0.81–0.83 in)



2. Install:
   - Water pump seal “1” New

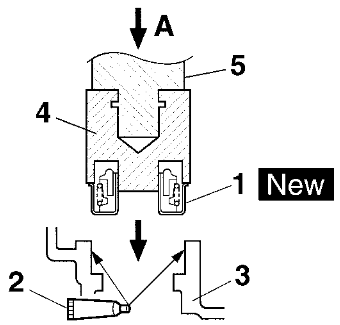
ECA14080
NOTICE

Never lubricate the water pump seal surface with oil or grease.

TIP

- Install the water pump seal with the special tools.
- Before installing the water pump seal, apply Yamaha bond No.1215 (Three Bond No.1215®) “2” to the water pump housing “3”.

Mechanical seal installer
90890-04078
Water pump seal installer
YM-33221-A
Middle driven shaft bearing driver
90890-04058
Bearing driver 40 mm
YM-04058
Yamaha bond No. 1215
90890-85505
(Three Bond No.1215®)

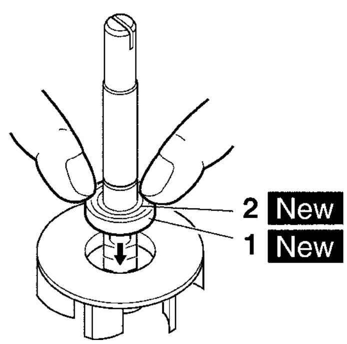


A. Push down
4. Mechanical seal installer
5. Middle driven shaft bearing driver

3. Install:
   - Rubber damper "1" New
   - Rubber damper holder "2" New

TIP

Before installing the rubber damper, apply tap water or coolant onto its outer surface.



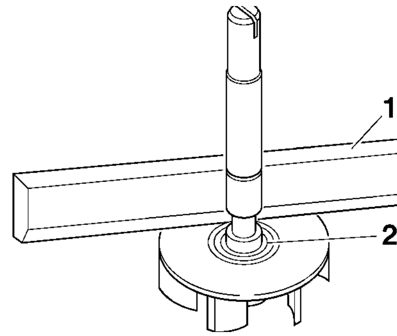
4. Measure:
   - Impeller shaft tilt
     Out of specification → Repeat steps (3) and (4).

ECA14090

NOTICE

Make sure the rubber damper and rubber damper holder are flush with the impeller.

Impeller shaft tilt limit
0.15 mm (0.006 in)

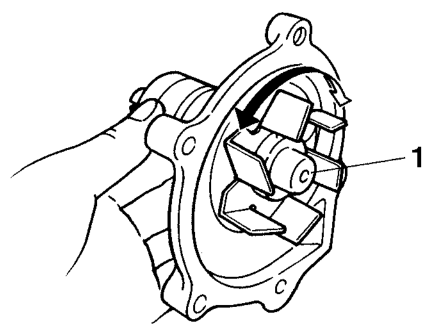


1. Straightedge
2. Impeller

5. Install:
   - Impeller "1"
   - Circlip New

TIP

After installation, check that the impeller shaft rotates smoothly.



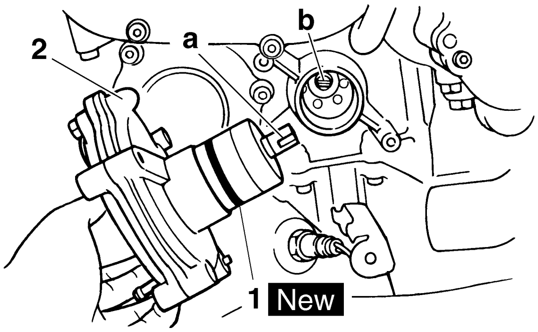
EAS26580

INSTALLING THE WATER PUMP

1. Install:
   - O-ring "1" New
   - Water pump assembly "2"

TIP

- Align the slit "a" on the impeller shaft with the projection "b" on the oil pump driven sprocket.
- Lubricate the O-ring with a thin coat of lithium soap base grease.



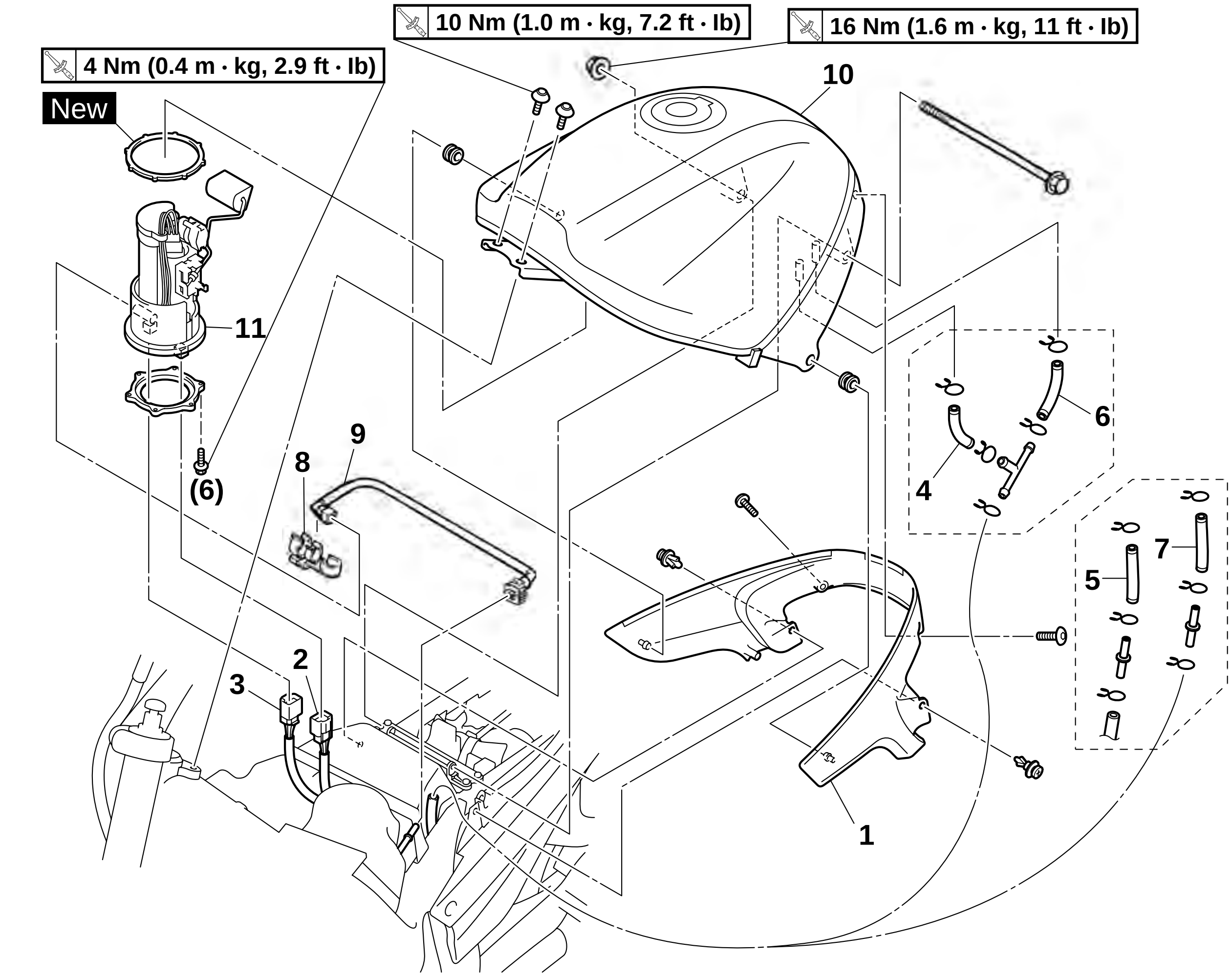
2. Fill:
   - Cooling system
     (with the specified amount of the recommended coolant)
     Refer to “CHANGING THE COOLANT” on page 3-25.
3. Check:
   - Cooling system
     Leaks → Repair or replace any faulty part.
4. Measure:
   - Radiator cap opening pressure
     Below the specified pressure → Replace the radiator cap.
     Refer to “CHECKING THE RADIATOR” on page 6-3.

FUEL SYSTEM

EAS26620

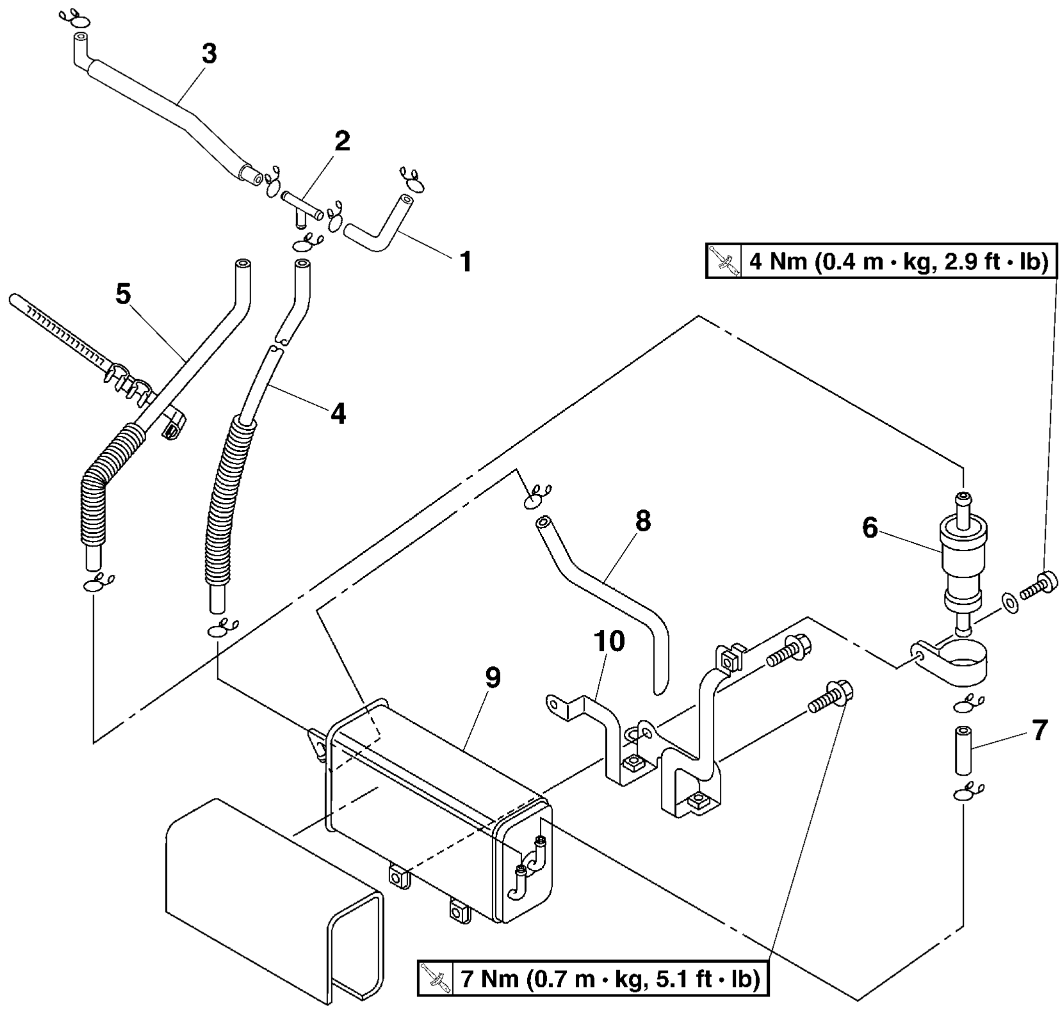
FUEL TANK

Removing the fuel tank



Order	Job/Parts to remove	Q'ty	Remarks
	Rider seat		Refer to "GENERAL CHASSIS" on page 4-1.
1	Fuel tank panel	1	
2	Fuel sender coupler	1	Disconnect.
3	Fuel pump coupler	1	Disconnect.
4	Fuel tank breather hose	1	Except for California
5	Fuel tank breather hose (fuel tank to joint)	1	For California only
6	Fuel tank overflow hose	1	Except for California
7	Fuel tank overflow hose (fuel tank to joint)	1	For California only
8	Fuel hose holder	1	
9	Fuel hose	1	
10	Fuel tank	1	
11	Fuel pump	1	
			For installation, reverse the removal procedure.

Removing the rollover valve and canister (for California only)



Order	Job/Parts to remove	Q'ty	Remarks
	Side cowlings		Refer to "GENERAL CHASSIS" on page 4-1.
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
1	Canister purge hose (throttle body-#1 to 3-way joint)	1	
2	3-way joint	1	
3	Canister purge hose (throttle body-#4 to 3-way joint)	1	
4	Canister purge hose (3-way joint to canister)	1	
5	Fuel tank breather hose (joint to rollover valve)	1	
6	Rollover valve	1	
7	Fuel tank breather hose (rollover valve to canister)	1	
8	Canister breather hose	1	
9	Canister	1	
10	Canister bracket	1	
			For installation, reverse the removal procedure.

EAS26630
REMOVING THE FUEL TANK

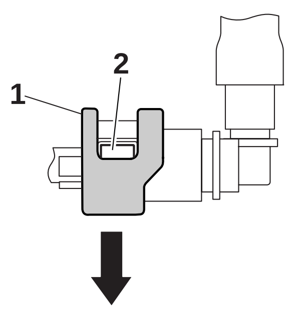
1. Extract the fuel in the fuel tank through the fuel tank cap with a pump.
2. Remove:
   - Fuel hose

EW3P61012
WARNING

Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hoses.

TIP

- To remove the fuel hose from the fuel rail, slide the fuel hose connector cover “1” on the end of the hose in the direction of the arrow shown, press the two buttons “2” on the sides of the connector, and then remove the hose.
- Remove the fuel hose manually without using any tools.
- Before removing the hose, place a few rags in the area under where it will be removed.



3. Remove:
   - Fuel tank

TIP

Do not set the fuel tank down on the installation surface of the fuel pump. Be sure to lean the fuel tank against a wall or the like.

EAS26640
REMOVING THE FUEL PUMP

1. Remove:
   - Fuel pump

ECA14720
NOTICE

- **Do not drop the fuel pump or give it a strong shock.**
- **Do not touch the base section of the fuel sender.**

EAS26670
CHECKING THE FUEL PUMP BODY

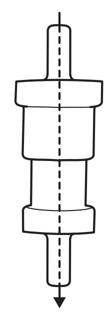
1. Check:
   - Fuel pump body
     Obstruction → Clean.
     Cracks/damage → Replace fuel pump assembly.

ET3P6G004
CHECKING THE ROLLOVER VALVES (for California only)

1. Check:
   - Rollover valve
     Damage/faulty → Replace.

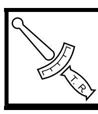
TIP

- Check that air flows smoothly only in the direction of the arrow shown in the illustration.
- The rollover valve must be in an upright position when checking the airflow.



EAS26700
INSTALLING THE FUEL PUMP

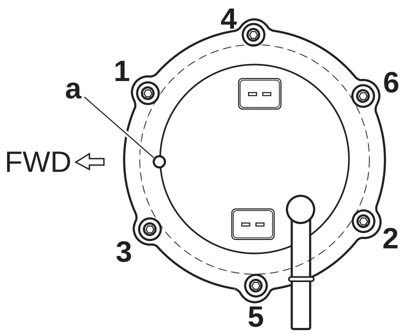
1. Install:
   - Fuel pump



Fuel pump bolts
4 Nm (0.4 m·kg, 2.9 ft·lb)

TIP

- Do not damage the installation surfaces of the fuel tank when installing the fuel pump.
- Always use a new fuel pump gasket.
- Install the fuel pump as shown in the illustration.
- Align the projection “a” on the fuel pump with the slot in the fuel pump bracket.
- Tighten the fuel pump bolts in the proper tightening sequence as shown.



ET3P61018

INSTALLING THE FUEL TANK

1. Install:
   - Fuel hose (fuel rail side)

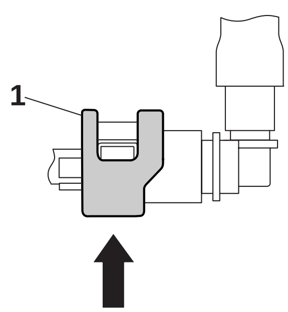
EC3P61007

NOTICE

When installing the fuel hose, make sure that it is securely connected, and that the fuel hose connector cover on the fuel hose is in the correct position, otherwise the fuel hose will not be properly installed.

TIP

- Install the fuel hose securely onto the fuel rail until a distinct "click" is heard.
- To install the fuel hose onto the fuel rail, slide the fuel hose connector cover "1" on the end of the hose in the direction of the arrow shown.



2. Install:
   - Fuel hose (fuel pump side)
   - Fuel hose holder

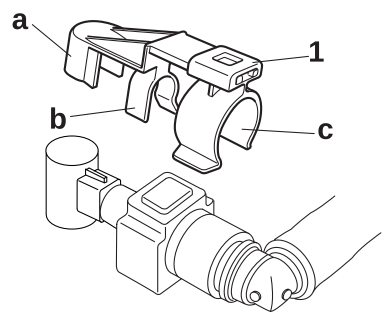
EC3P61008

NOTICE

When installing the fuel hose, make sure that it is securely connected, and that the fuel hose holder is in the correct position, otherwise the fuel hose will not be properly installed.

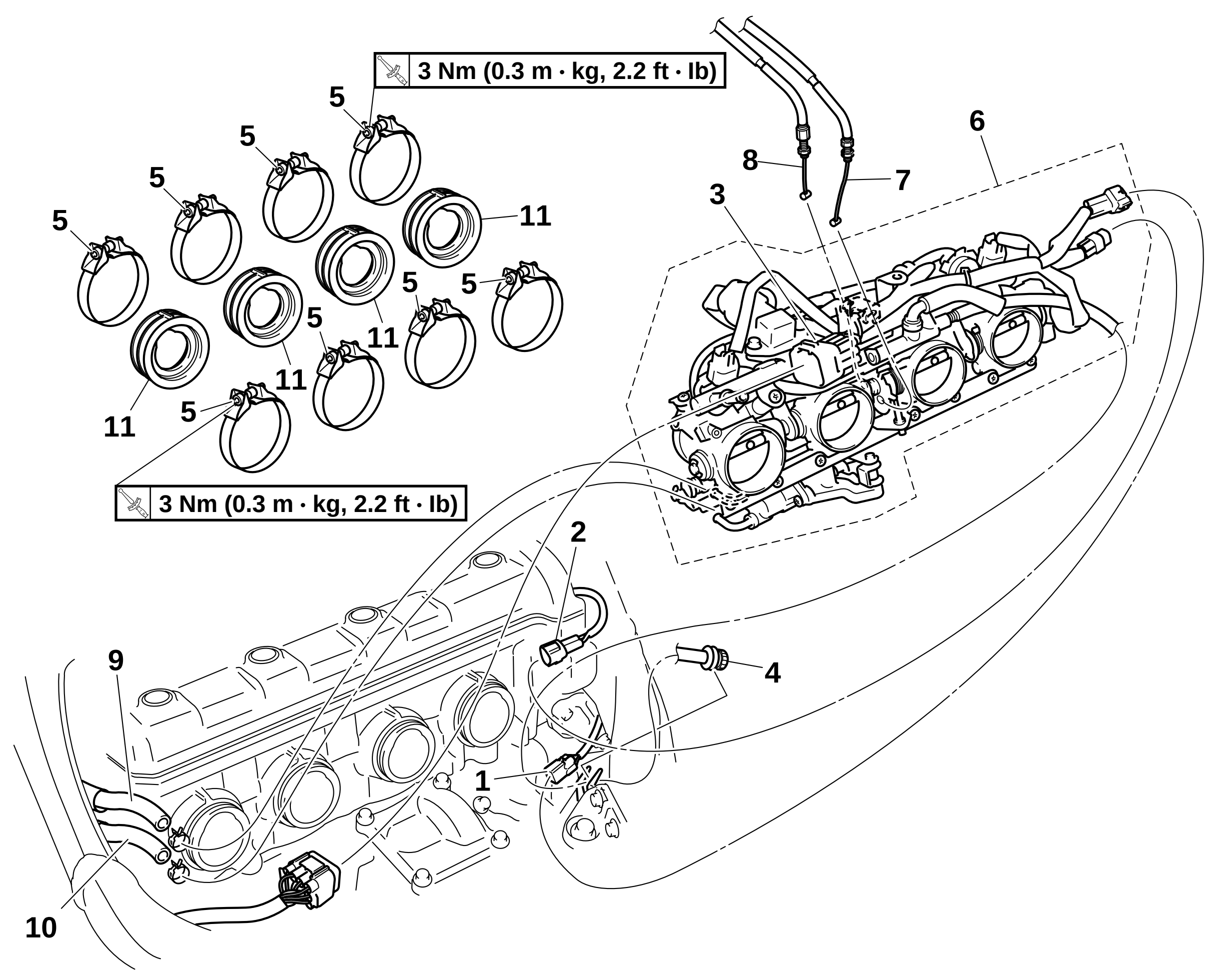
TIP

- Install the fuel hose connector securely onto the fuel tank until a distinct "click" is heard, and then make sure that it does not come loose.
- After installing the fuel hose holder "1", make sure that the sections "a", "b", and "c" of the holder are installed securely.



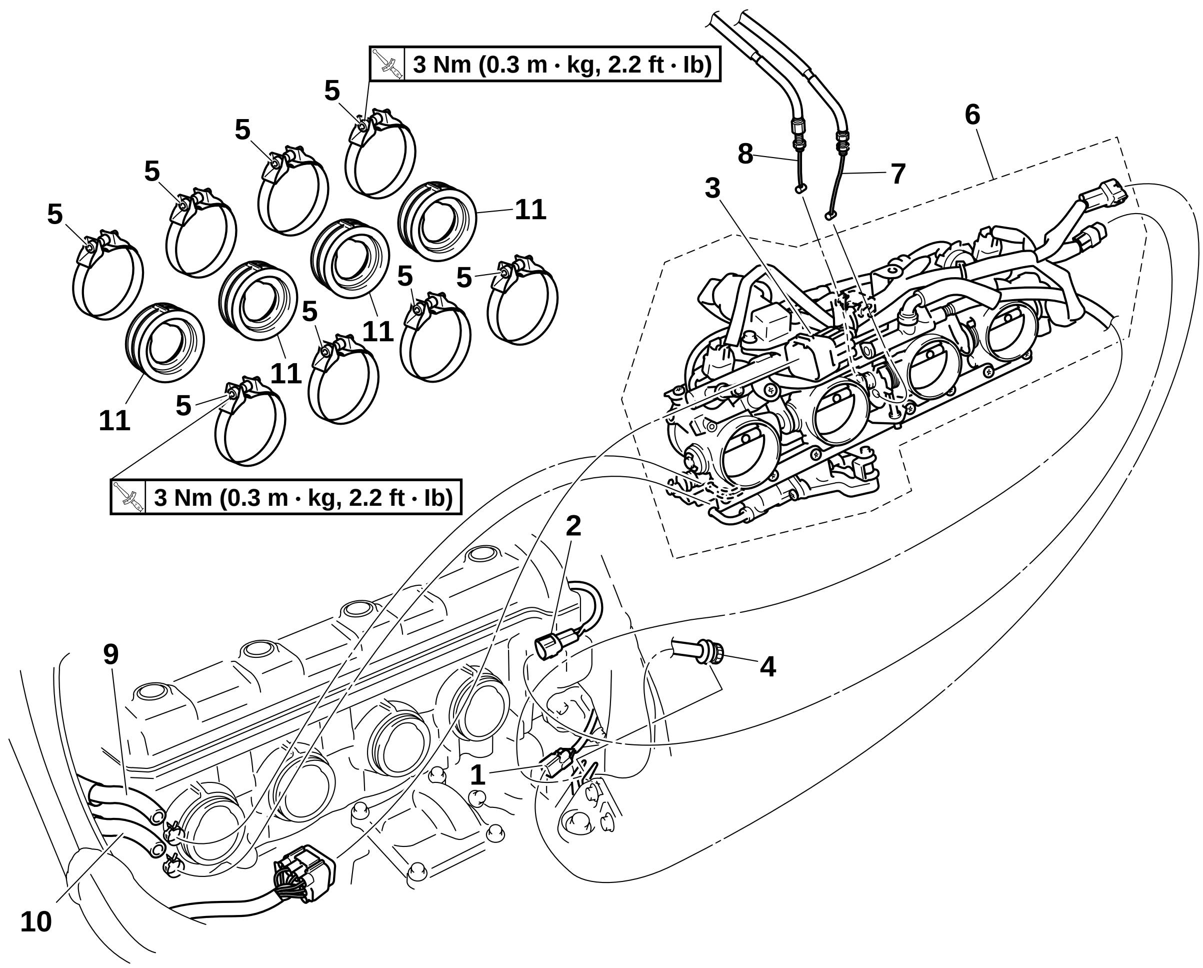
EAS26970
THROTTLE BODIES

Removing the throttle bodies



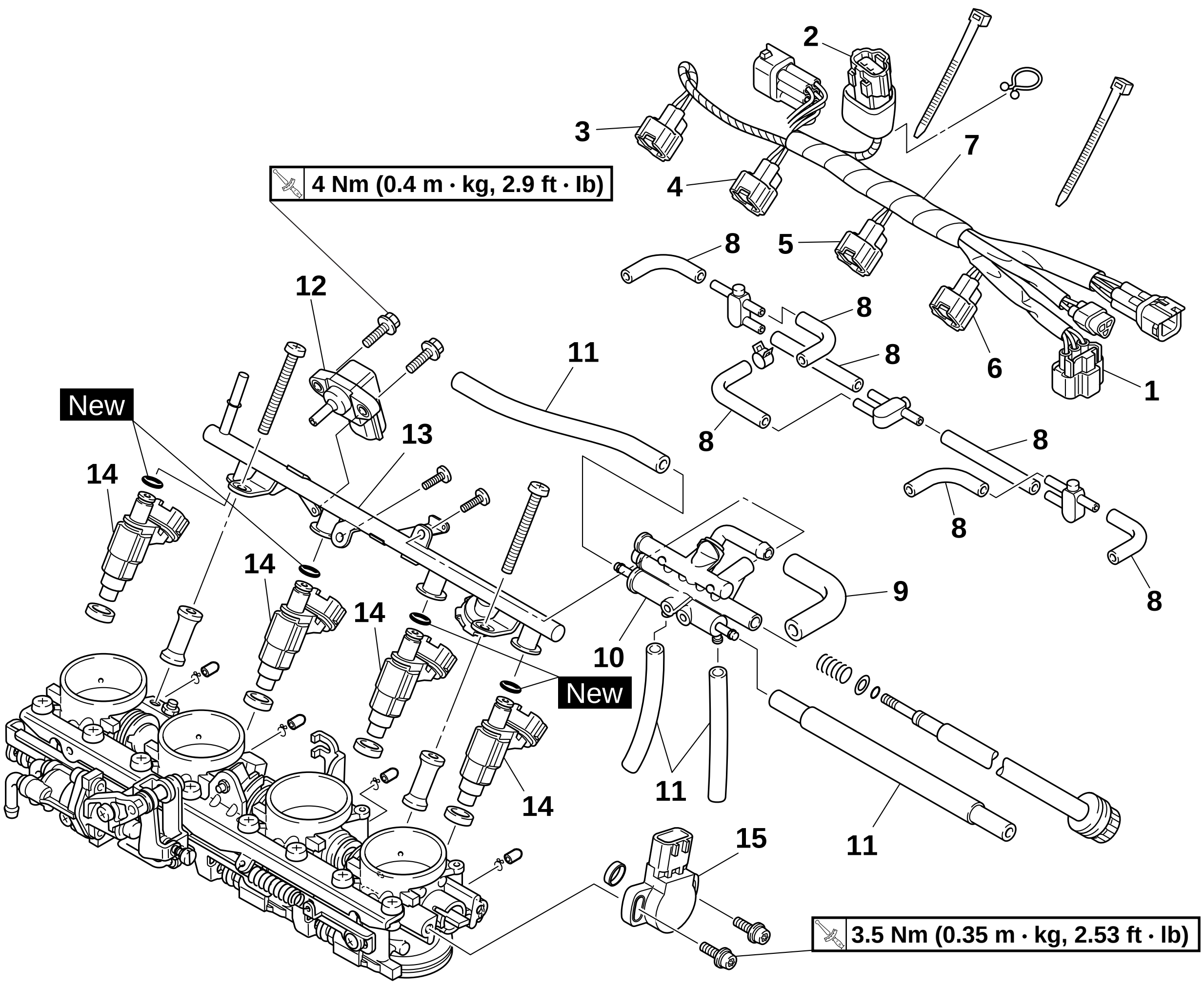
Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	T-bar/Air filter case		Refer to "GENERAL CHASSIS" on page 4-1.
	Air cut-off valve		Refer to "AIR INDUCTION SYSTEM" on page 7-11.
	Coolant		Drain. Refer to "CHANGING THE COOLANT" on page 3-25.
1	O_2 sensor coupler	1	Disconnect.
2	Cylinder identification sensor coupler	1	Disconnect.
3	Sub-wire harness coupler	1	Disconnect.
4	Engine idle speed adjusting screw	1	Disconnect.
5	Throttle body joint clamp screw	8	Loosen.
6	Throttle bodies	1	
7	Throttle cable (accelerator cable)	1	Disconnect.
8	Throttle cable (decelerator cable)	1	Disconnect.
9	Plunger control unit hose 1	1	Disconnect.

Removing the throttle bodies



Order	Job/Parts to remove	Q'ty	Remarks
10	Plunger control unit hose 2	1	Disconnect.
11	Throttle body joint	4	
			For installation, reverse the removal procedure.

Removing the injectors



Order	Job/Parts to remove	Q'ty	Remarks
1	Throttle position sensor coupler	1	Disconnect.
2	Intake air pressure sensor coupler	1	Disconnect.
3	Cylinder-#1 injector coupler	1	Disconnect.
4	Cylinder-#2 injector coupler	1	Disconnect.
5	Cylinder-#3 injector coupler	1	Disconnect.
6	Cylinder-#4 injector coupler	1	Disconnect.
7	Sub-wire harness	1	
8	Negative pressure hose	7	
9	Bypass air unit inlet hose	1	
10	Bypass air unit	1	
11	Bypass air unit outlet hose	4	
12	Intake air pressure sensor	1	
13	Fuel rail	1	
14	Injector	4	
15	Throttle position sensor	1	
			For installation, reverse the removal procedure.

EAS26980

CHECKING THE INJECTORS

1. Check:
   - Injectors
     Damage → Replace.

EAS26990

CHECKING THE THROTTLE BODIES

1. Check:
   - Throttle bodies
     Cracks/damage → Replace the throttle bodies as a set.
2. Check:
   - Fuel passages
     Obstructions → Clean.

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a. Wash the throttle bodies in a petroleum-based solvent.
   Do not use any caustic carburetor cleaning solution.
b. Blow out all of the passages with compressed air.

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ET3P61044

CHECKING THE FUEL PRESSURE

1. Check:
   - Fuel pressure

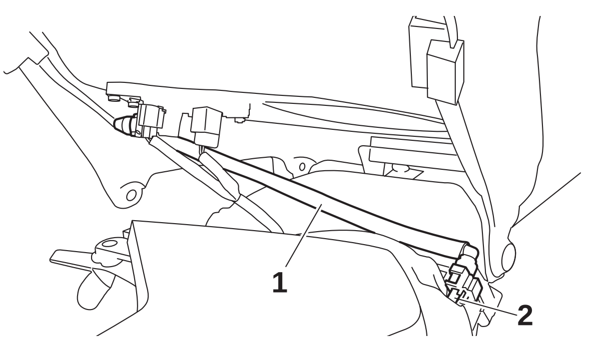
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a. Remove the rider seat.
   Refer to “GENERAL CHASSIS” on page 4-1.
b. Disconnect the fuel hose “1” from the fuel rail “2”.

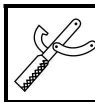
EW3P61012

⚠ WARNING

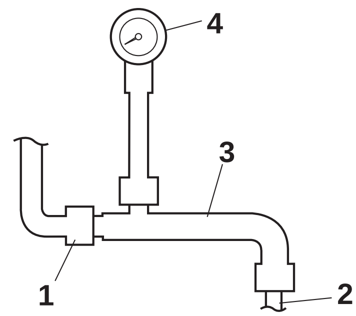
Cover fuel hose connections with a cloth when disconnecting them. Residual pressure in the fuel lines could cause fuel to spurt out when removing the hoses.



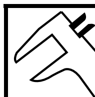
c. Connect the fuel pressure adapter “3” between the fuel hose “1” and fuel rail “2”.
d. Connect the pressure gauge “4” to fuel pressure adapter “3”.



Pressure gauge
90890-03153
YU-03153
Fuel pressure adapter
90890-03176
YM-03176



e. Start the engine.
f. Measure the fuel pressure.



Output pressure
324.0 kPa (47.0 psi) (3.24 kgf/cm²)

Faulty → Replace the fuel pump.

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EAS27030

ADJUSTING THE THROTTLE POSITION SENSOR

TIP

Before adjusting the throttle position sensor, the engine idling speed should be properly adjusted.

1. Check:
   - Throttle position sensor
     Refer to “CHECKING THE THROTTLE POSITION SENSOR” on page 8-241.
2. Adjust:
   - Throttle position sensor angle

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Connect the throttle position sensor coupler to the throttle position sensor.
b. Connect the digital circuit tester to the throttle position sensor.

- Positive tester probe → yellow “1”
- Negative tester probe → black/blue “2”

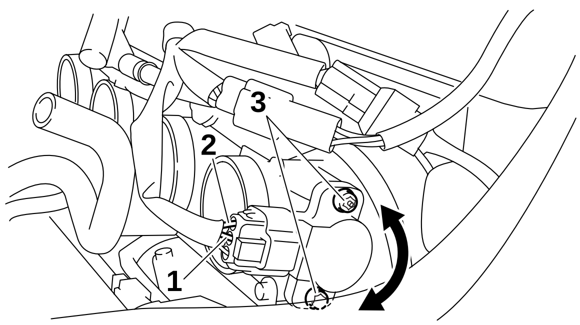
	Digital circuit tester **90890-03174** **Model 88 Multimeter with tachometer** **YU-A1927**

c. Turn the main switch to “ON”.
d. Measure the throttle position sensor voltage.
e. Adjust the throttle position sensor angle so that the voltage is within the specified range.

	Output voltage (at idle) **0.63–0.73 V**

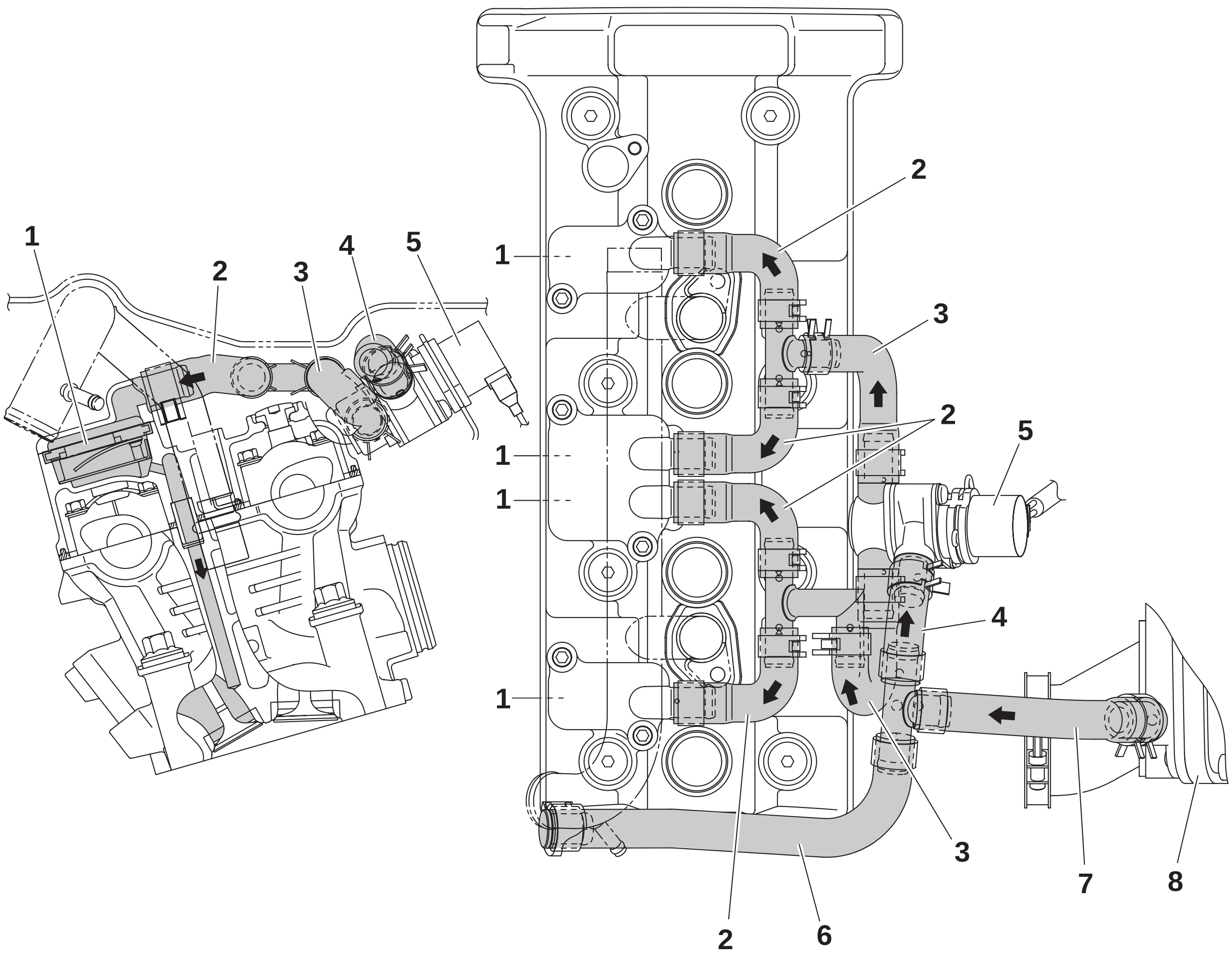
f. After adjusting the throttle position sensor angle, tighten the throttle position sensor screws “3” to specification.

	Throttle position sensor screw **3.5 Nm (0.35 m·kg, 2.53 ft·lb)**



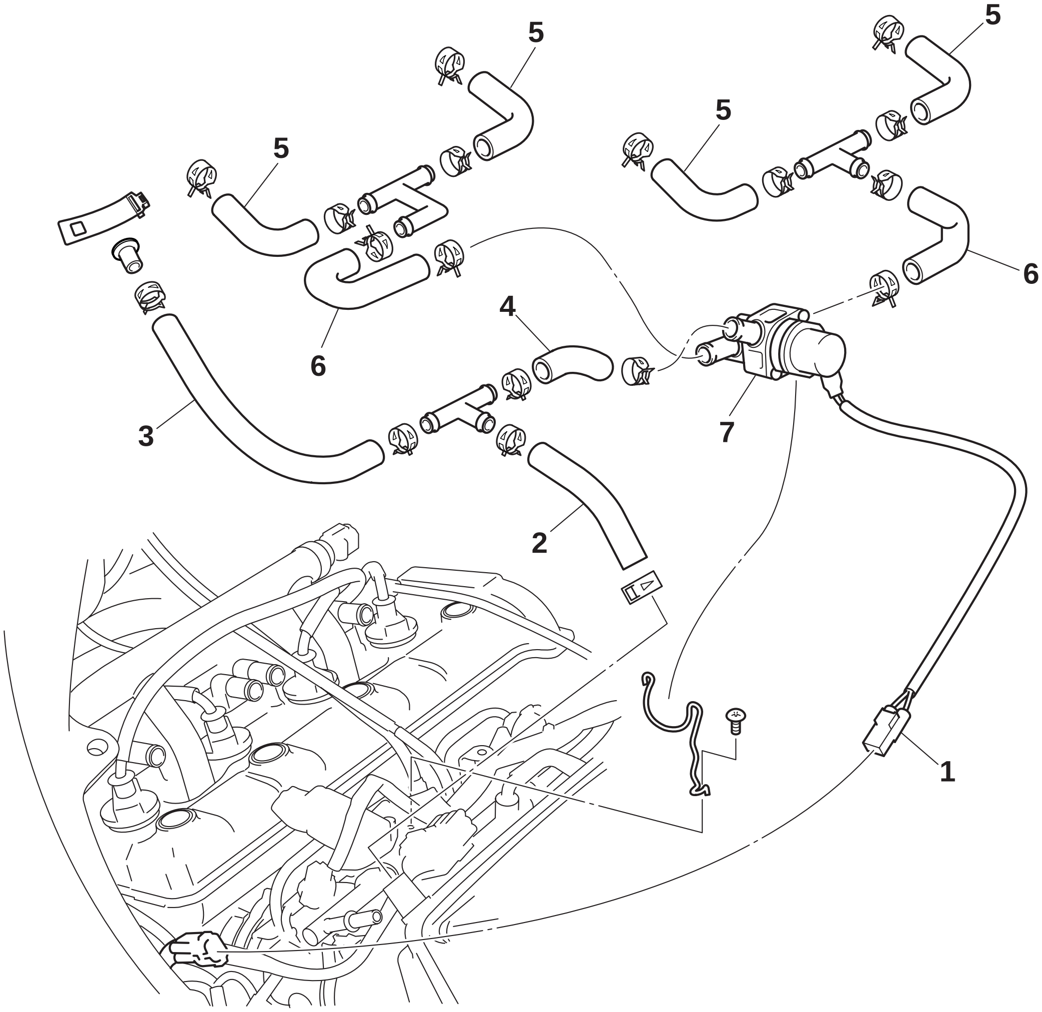
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EAS27040
AIR INDUCTION SYSTEM



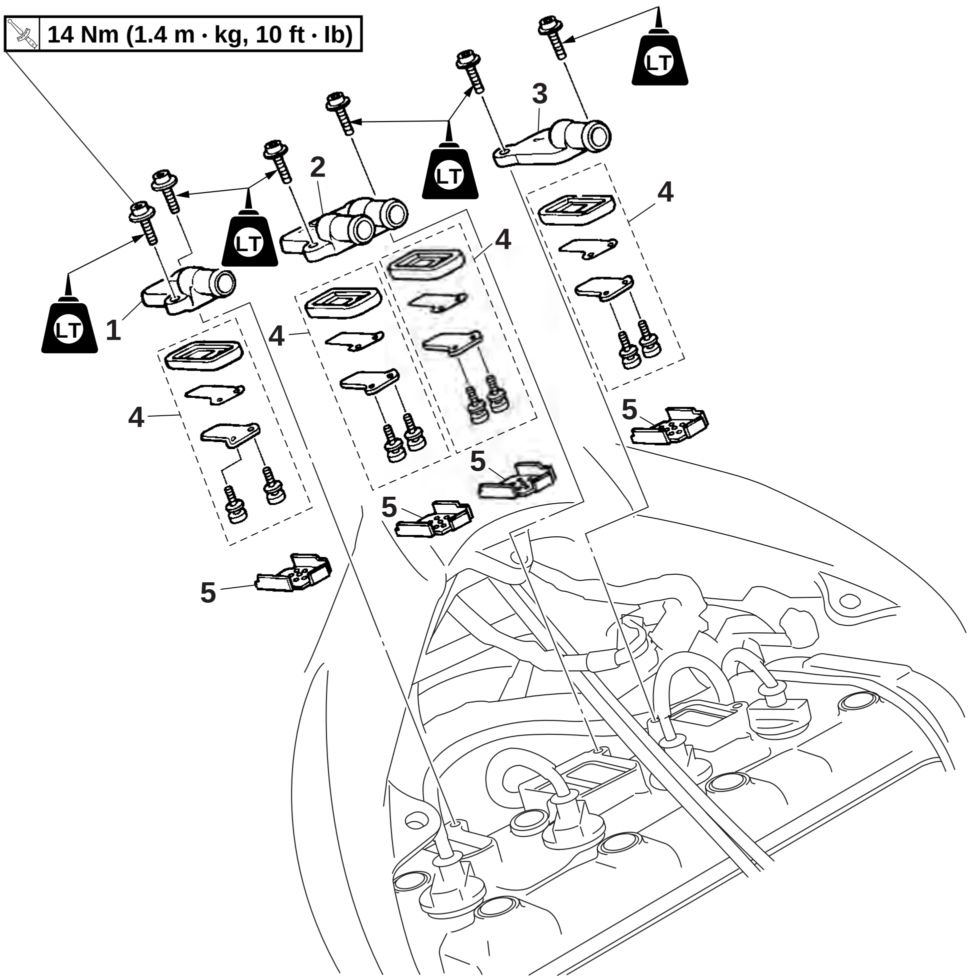
1. Reed valve assembly
2. Air induction system hose (3-way joint to reed valve cover)
3. Air induction system hose (air cut-off valve to 3-way joint)
4. Air induction system hose (3-way joint to air cut-off valve)
5. Air cut-off valve
6. Air induction system hose (3-way joint to hose plug)
7. Air induction system hose (air filter case joint assembly to 3-way joint)
8. Air filter case joint assembly

Removing the air cut-off valve



Order	Job/Parts to remove	Q'ty	Remarks
	Fuel tank		Refer to "FUEL TANK" on page 7-1.
	T-bar		Refer to "GENERAL CHASSIS" on page 4-1.
1	Air induction system solenoid coupler	1	Disconnect.
2	Air induction system hose (air filter case joint assembly to 3-way joint)	1	
3	Air induction system hose (3-way joint to hose plug)	1	
4	Air induction system hose (3-way joint to air cut-off valve)	1	
5	Air induction system hose (3-way joint to reed valve cover)	4	
6	Air induction system hose (air cut-off valve to 3-way joint)	2	
7	Air cut-off valve	1	
			For installation, reverse the removal procedure.

Removing the reed valves



Order	Job/Parts to remove	Q'ty	Remarks
	Thermostat inlet pipe 1		Refer to "THERMOSTAT" on page 6-6.
1	Reed valve cover (cylinder-#1)	1	
2	Reed valve cover (cylinders-#2/#3)	1	
3	Reed valve cover (cylinder-#4)	1	
4	Reed valve assembly	4	
5	Reed valve plate	4	
			For installation, reverse the removal procedure.

EAS27050

CHECKING THE PRESSURE REGULATOR

1. Check:
   - Pressure regulator
     Damage → Replace.

EAS27060

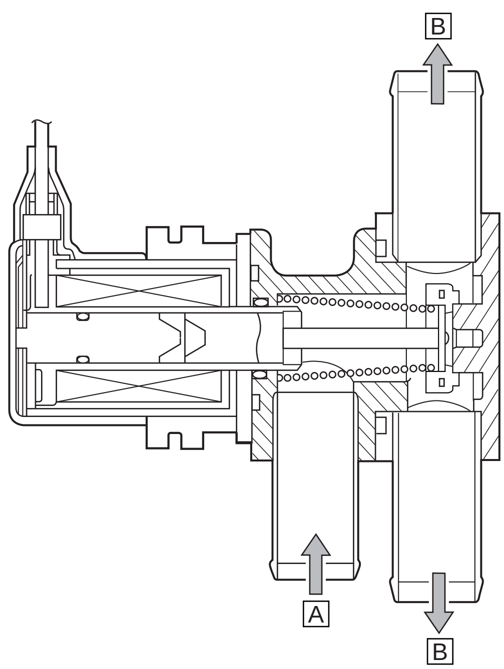
CHECKING THE AIR INDUCTION SYSTEM

Air injection

The air induction system burns unburned exhaust gases by injecting fresh air (secondary air) into the exhaust port, reducing the emission of hydrocarbons. When there is negative pressure at the exhaust port, the reed valve opens, allowing secondary air to flow into the exhaust port. The required temperature for burning the unburned exhaust gases is approximately 600 to 700 °C (1112 to 1292 °F).

Air cut-off valve

The air cut-off valve is controlled by the signals from the ECU in accordance with the combustion conditions. Ordinarily, the air cut-off valve opens to allow the air to flow during idle and closes to cut-off the flow when the vehicle is being driven. However, if the coolant temperature is below the specified value, the air cut-off valve remains open and allows the air to flow into the exhaust pipe until the temperature becomes higher than the specified value.



A. From the air filter case
B. To the reed valve

1. Check:
   - Hoses
     Loose connections → Connect properly.
     Cracks/damage → Replace.
   - Pipes
     Cracks/damage → Replace.
2. Check:
   - Reed valve
   - Reed valve stopper
   - Reed valve seat
     Cracks/damage → Replace the reed valve.
3. Check:
   - Air cut-off valve
     Cracks/damage → Replace.
4. Check:
   - Air induction system solenoid
     Refer to "CHECKING THE AIR INDUCTION SYSTEM SOLENOID" on page 8-241.

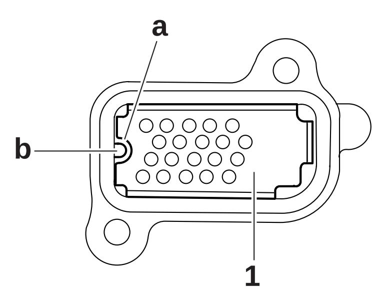
EAS27070

INSTALLING THE AIR INDUCTION SYSTEM

1. Install:
   - Reed valve plate "1"

TIP

Align the notch "a" in each plate with the projection "b" of each reed valve seat on the cylinder head cover.



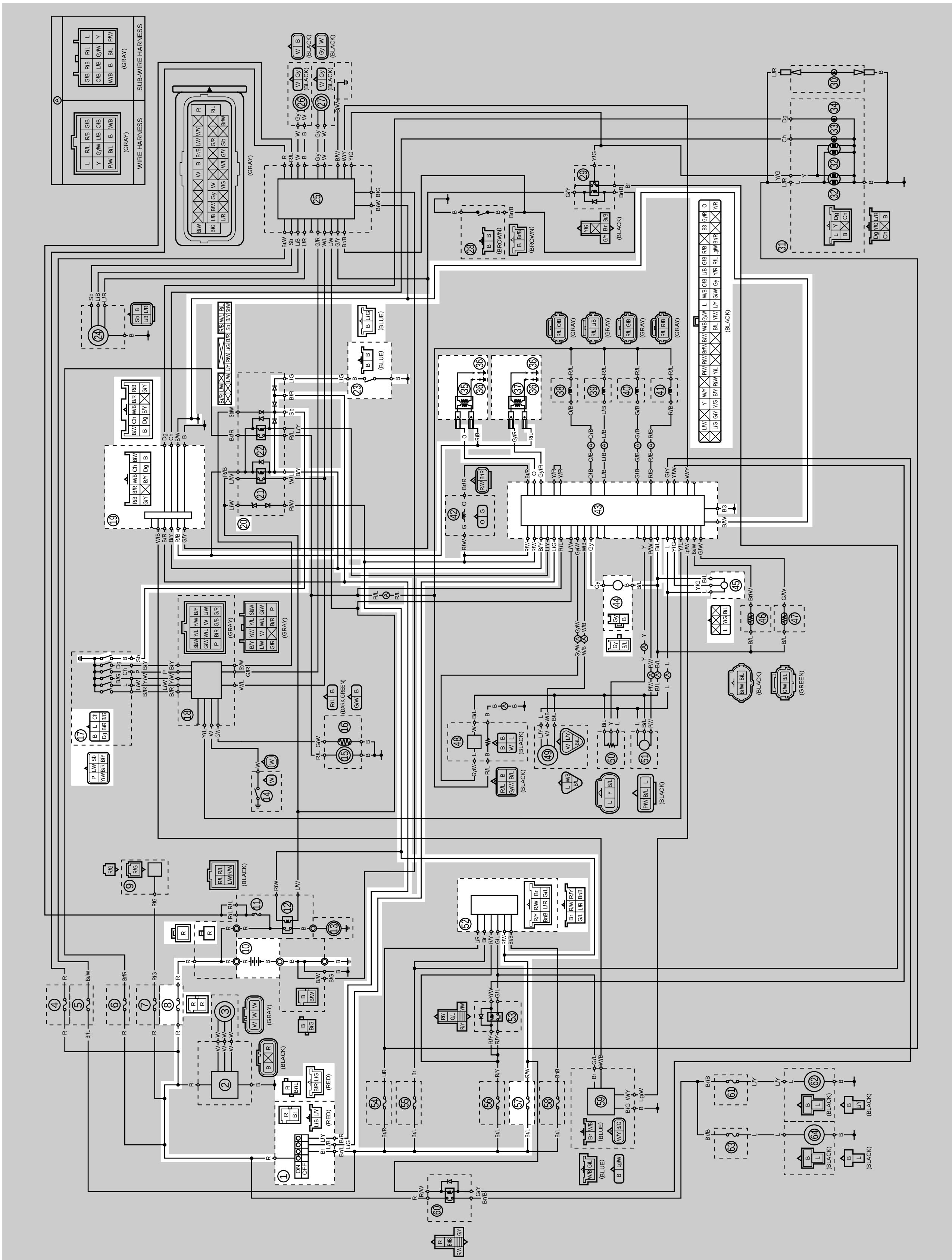
ELECTRICAL SYSTEM

EAS27090

IGNITION SYSTEM

EAS27110

CIRCUIT DIAGRAM (1/2) (FJR13A)

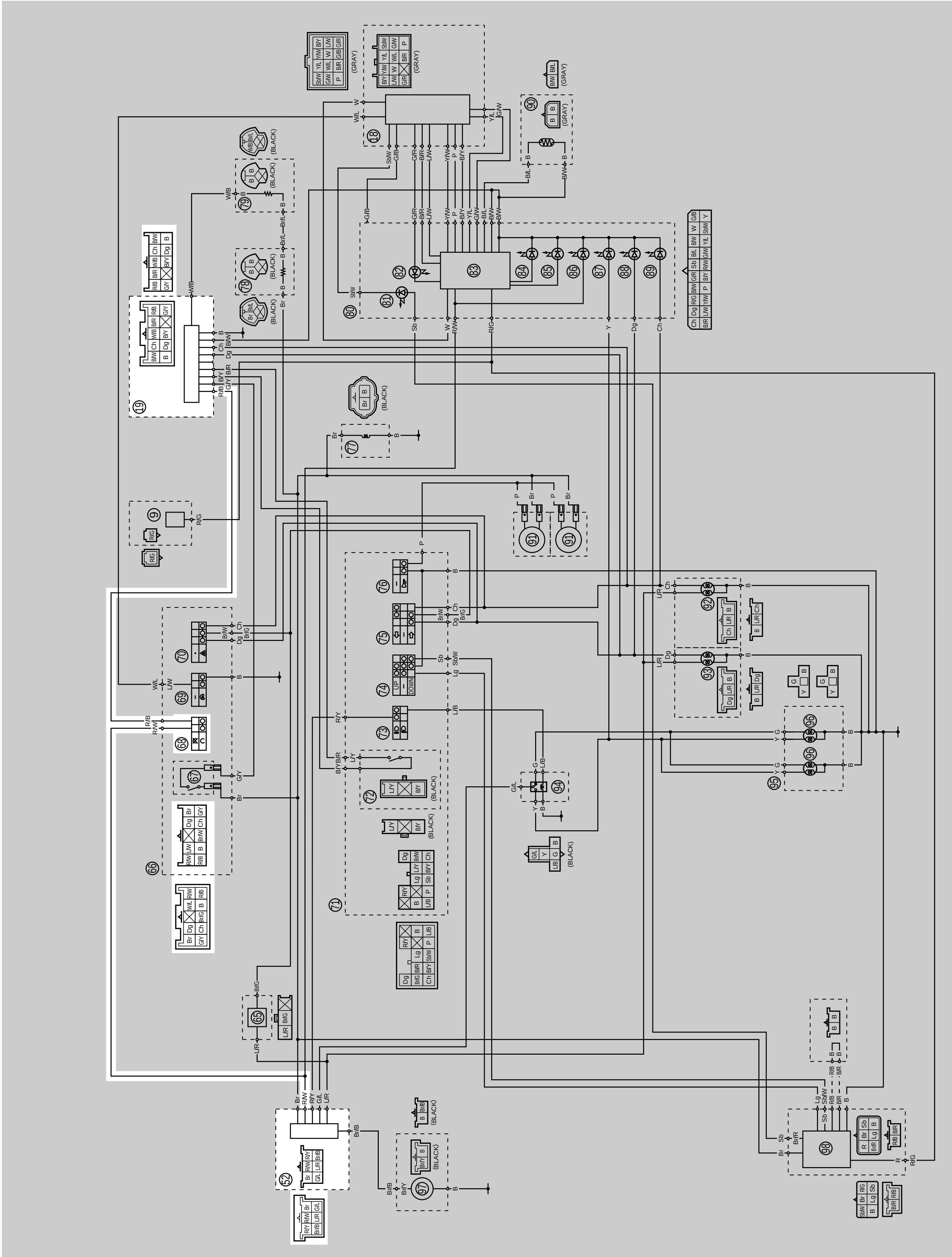


1. Main switch
8. Main fuse
10. Battery
17. Gear position switch
19. Coupler 3 (wire harness–front cowling wire harness)
20. Relay unit
23. Sidestand switch
35. Cylinders-#1/#4 ignition coil
36. Spark plug
37. Cylinders-#2/#3 ignition coil
43. ECU (engine control unit)
44. Crankshaft position sensor
45. Lean angle sensor
52. Coupler 4 (wire harness–front cowling wire harness)
57. Ignition fuse

ET3P61001

CIRCUIT DIAGRAM (2/2) (FJR13A)

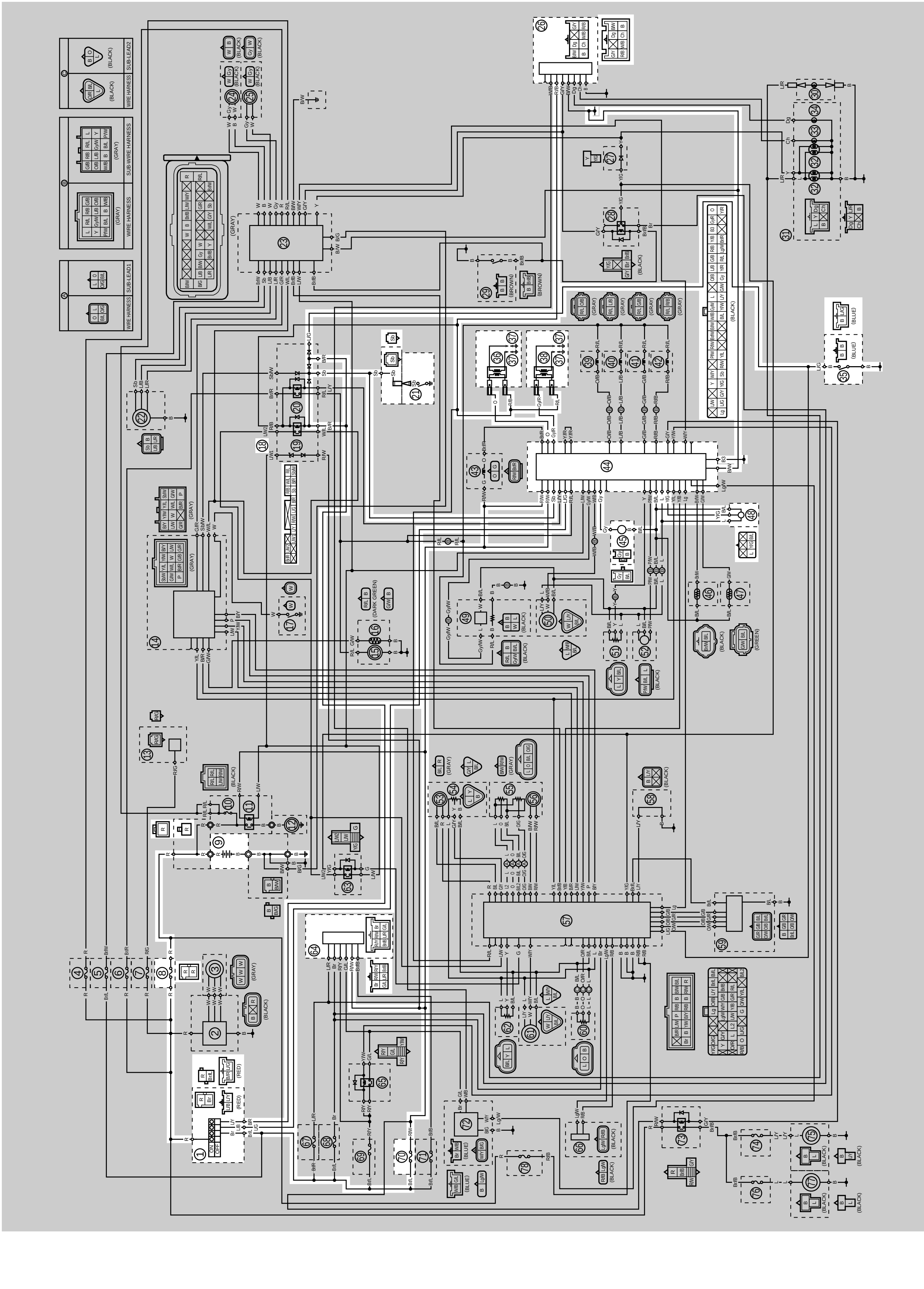
Front cowling wire harness



19. Coupler 3 (wire harness–front cowling wire harness)
52. Coupler 4 (wire harness–front cowling wire harness)
68. Engine stop switch

ET3P66001

CIRCUIT DIAGRAM (1/2) (FJR13AE)

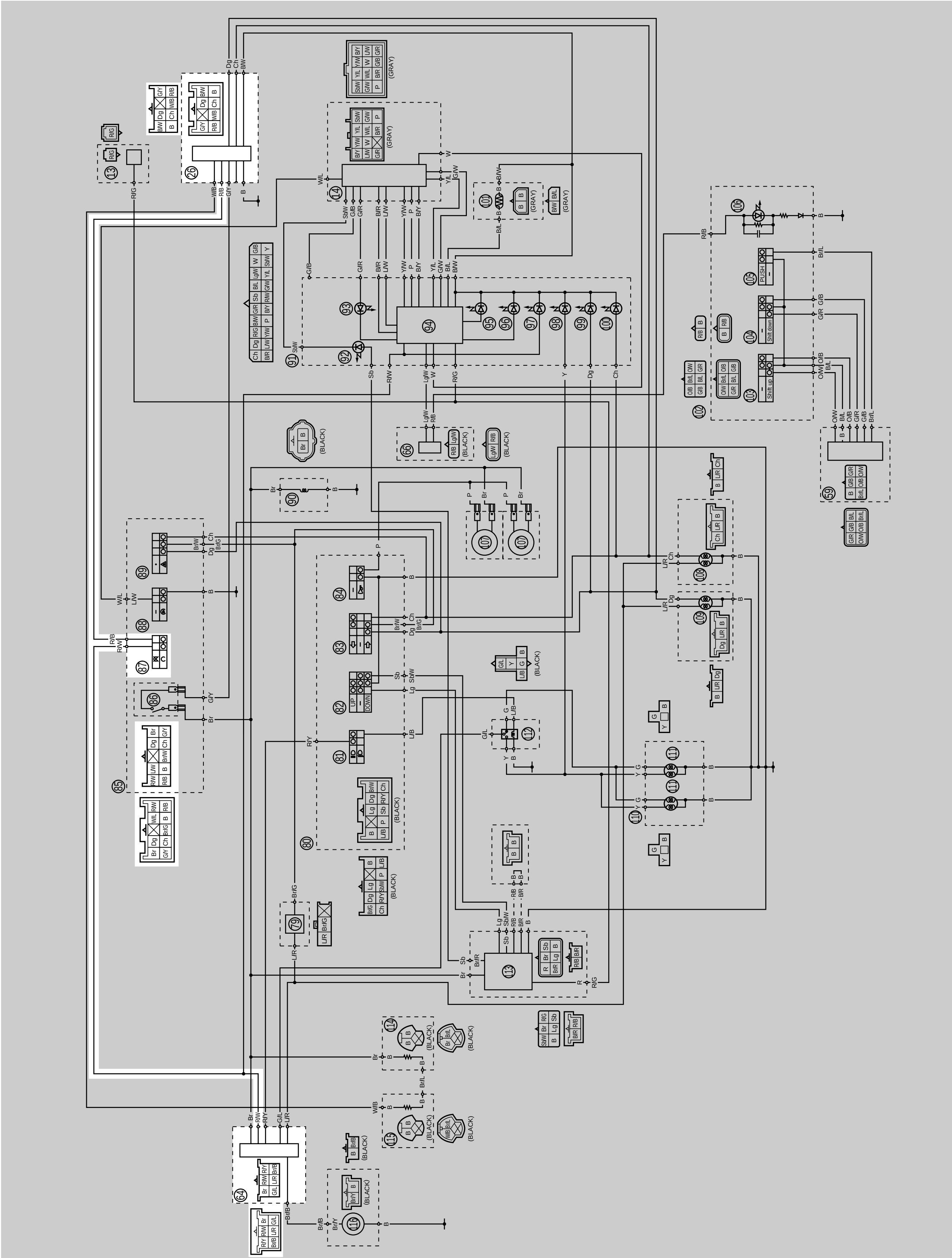


1. Main switch
8. Main fuse
9. Battery
18. Relay unit
21. Neutral switch
26. Coupler 3 (wire harness–front cowling wire harness)
35. Sidestand switch
36. Cylinders-#1/#4 ignition coil
37. Spark plug
38. Cylinders-#2/#3 ignition coil
44. ECU (engine control unit)
45. Crankshaft position sensor
48. Lean angle sensor
64. Coupler 5 (wire harness–front cowling wire harness)
70. Ignition fuse

ET3P66002

CIRCUIT DIAGRAM (2/2) (FJR13AE)

Front cowling wire harness



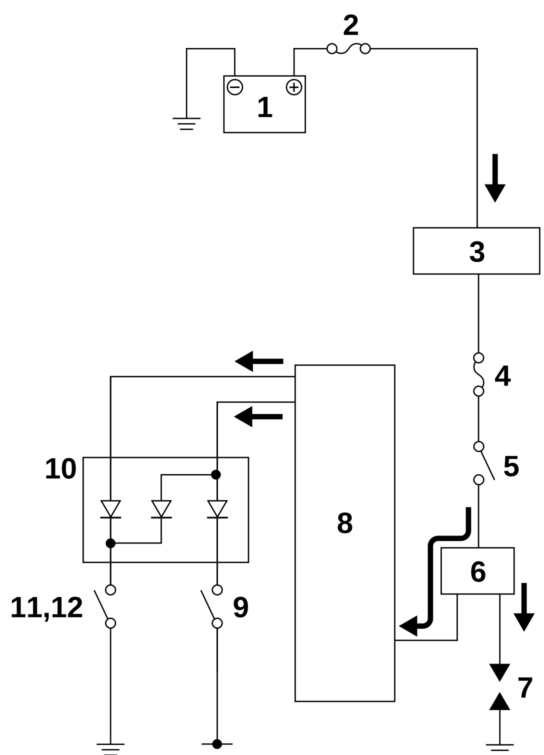
26. Coupler 3 (wire harness–front cowling wire harness)
64. Coupler 5 (wire harness–front cowling wire harness)
87. Engine stop switch

ET3P61002

ENGINE STOPPING DUE TO SIDESTAND OPERATION

When the engine is running and the transmission is in gear, the engine will stop if the sidestand is moved down. This is because the electric current from the ignition coils does not flow to the ECU when both the gear position switch (neutral circuit) and sidestand switch are set to “OFF”, thereby preventing the spark plugs from producing a spark. However, the engine continues to run under the following conditions:

- The transmission is in gear (the neutral circuit of the gear position switch is open) and the sidestand is up (the sidestand switch circuit is closed).
- The transmission is in neutral (the neutral circuit of the gear position switch is closed) and the sidestand is down (the sidestand switch circuit is open).



1. Battery
2. Main fuse
3. Main switch
4. Ignition fuse
5. Engine stop switch
6. Ignition coil
7. Spark plug
8. ECU (engine control unit)
9. Sidestand switch
10. Relay unit (diode)
11. Gear position switch (neutral circuit) (FJR13A)
12. Neutral switch (FJR13AE)

EAS27140

TROUBLESHOOTING

The ignition system fails to operate (no spark or intermittent spark).

TIP

- Before troubleshooting, remove the following part(s):

1. Front cowling assembly
2. Fuel tank
3. T-bar
4. Throttle bodies
5. Storage compartment

Check	Result	Action
1. Check the fuses. (Main and ignition) Refer to "CHECKING THE FUSES" on page 8-227.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-228.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the spark plugs. Refer to "CHECKING THE SPARK PLUGS" on page 3-11.	NG →	Re-gap or replace the spark plug(s).
OK ↓		
4. Check the ignition spark gap. Refer to "CHECKING THE IGNITION SPARK GAP" on page 8-236.	OK →	Ignition system is OK.
NG ↓		
5. Check the spark plug caps. Refer to "CHECKING THE SPARK PLUG CAPS" on page 8-235.	NG →	Replace the spark plug cap(s).
OK ↓		
6. Check the ignition coils. Refer to "CHECKING THE IGNITION COILS" on page 8-235.	NG →	Replace the ignition coil(s).
OK ↓		
7. Check the crankshaft position sensor. Refer to "CHECKING THE CRANKSHAFT POSITION SENSOR" on page 8-236.	NG →	Replace the crankshaft position sensor.
OK ↓		

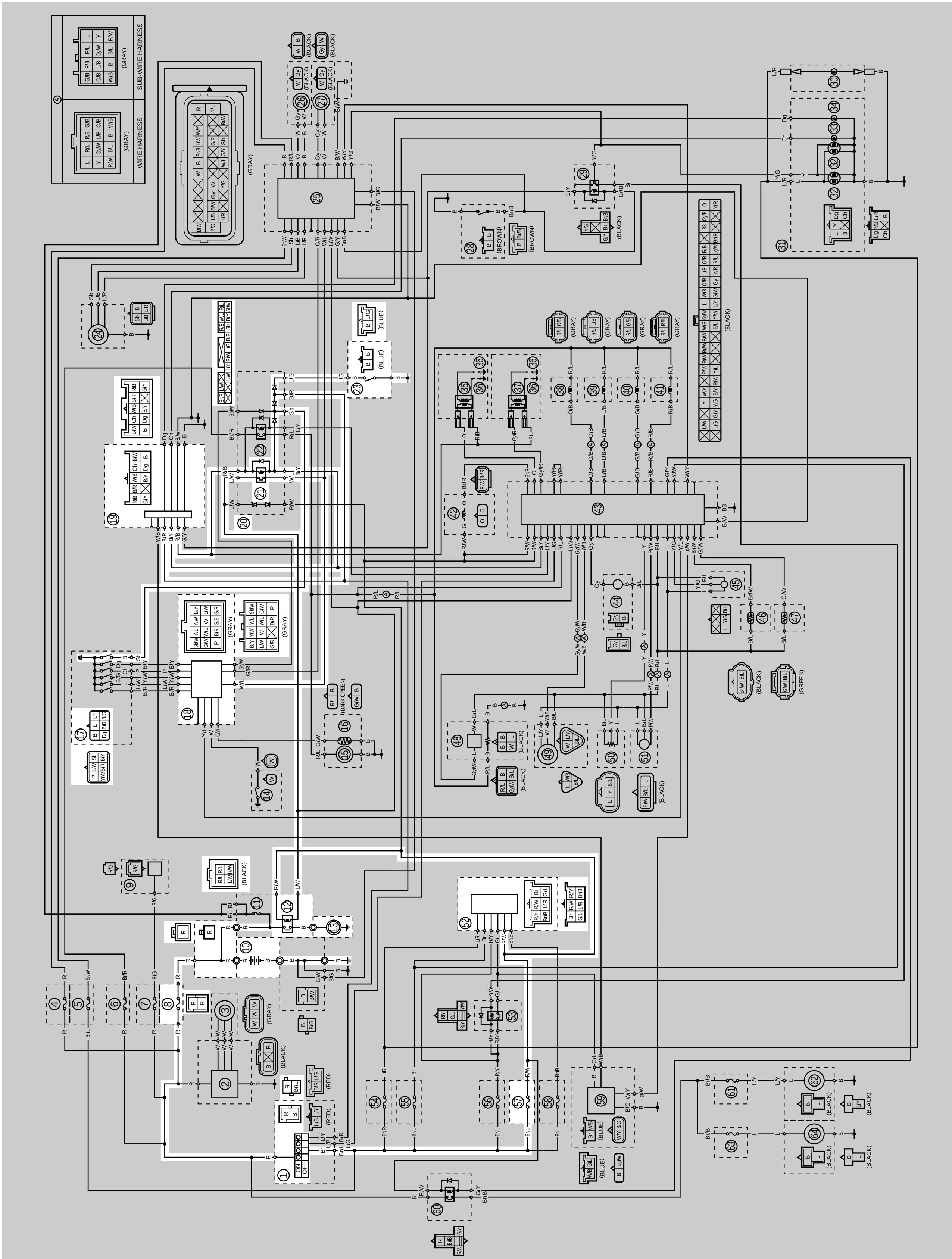
Check	Result	Action
8. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the main switch.
OK ↓		
9. Check the engine stop switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the right handlebar switch.
OK ↓		
10. Check the gear position switch. (FJR13A) Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the gear position switch.
OK ↓		
11. Check the neutral switch. (FJR13AE) Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the neutral switch.
OK ↓		
12. Check the sidestand switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the sidestand switch.
OK ↓		
13. Check the relay unit (diode). Refer to “CHECKING THE RELAY UNIT (DIODE)” on page 8-234.	NG →	Replace the relay unit.
OK ↓		
14. Check the lean angle sensor. Refer to “CHECKING THE LEAN ANGLE SENSOR” on page 8-236.	NG →	Replace the lean angle sensor.
OK ↓		
15. Check the entire ignition system wiring. Refer to “CIRCUIT DIAGRAM (1/2) (FJR13A)” on page 8-1, “CIRCUIT DIAGRAM (2/2) (FJR13A)” on page 8-3, “CIRCUIT DIAGRAM (1/2) (FJR13AE)” on page 8-5, and “CIRCUIT DIAGRAM (2/2) (FJR13AE)” on page 8-7.	NG →	Properly connect or repair the ignition system wiring.
OK ↓		
Replace the ECU.		

EAS27160

ELECTRIC STARTING SYSTEM

EAS27170

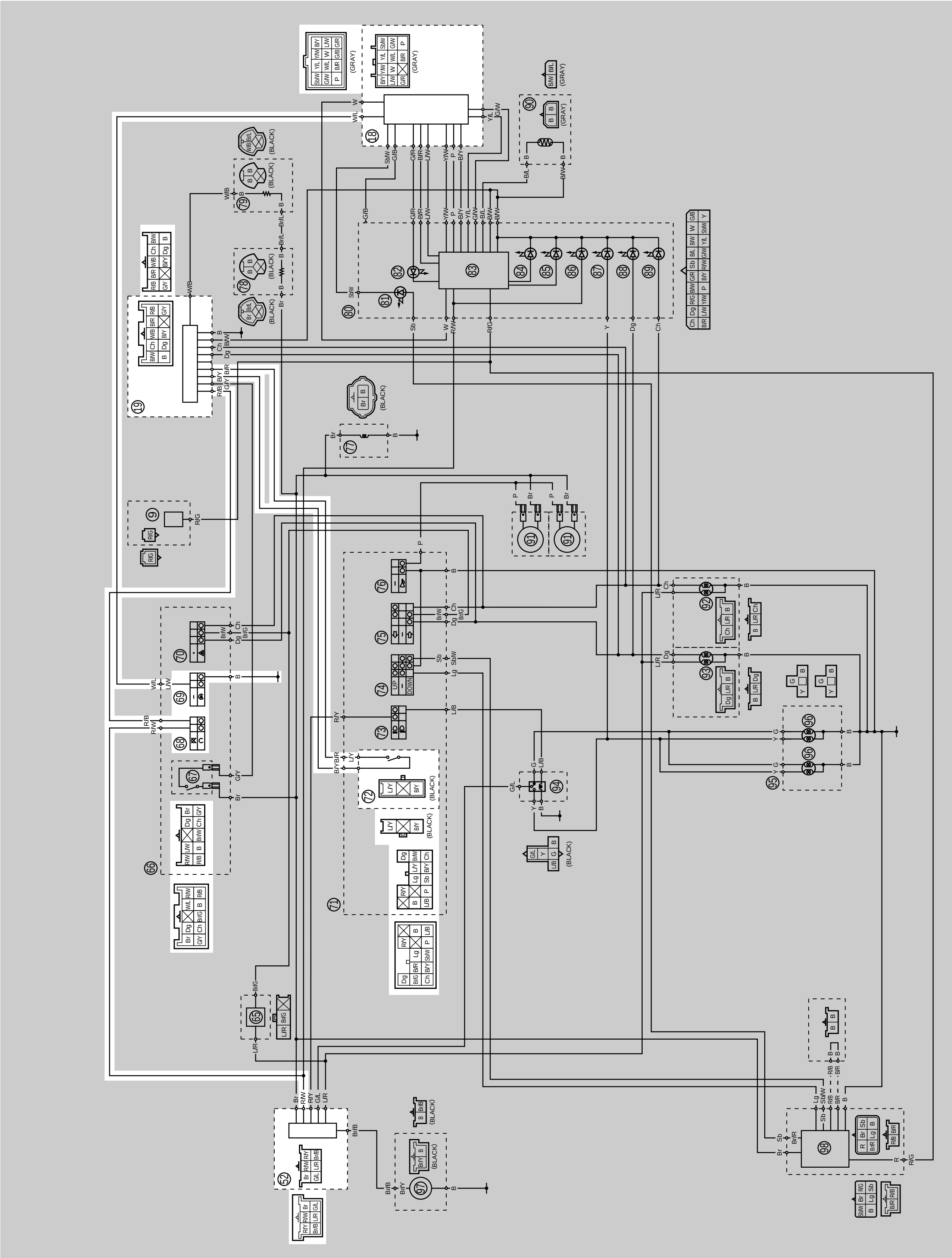
CIRCUIT DIAGRAM (1/2) (FJR13A)



1. Main switch
8. Main fuse
10. Battery
12. Starter relay
13. Starter motor
17. Gear position switch
18. Coupler 2 (wire harness–front cowling wire harness)
19. Coupler 3 (wire harness–front cowling wire harness)
20. Relay unit
21. Starting circuit cut-off relay
23. Sidestand switch
52. Coupler 4 (wire harness–front cowling wire harness)
57. Ignition fuse

ET3P61003
CIRCUIT DIAGRAM (2/2) (FJR13A)

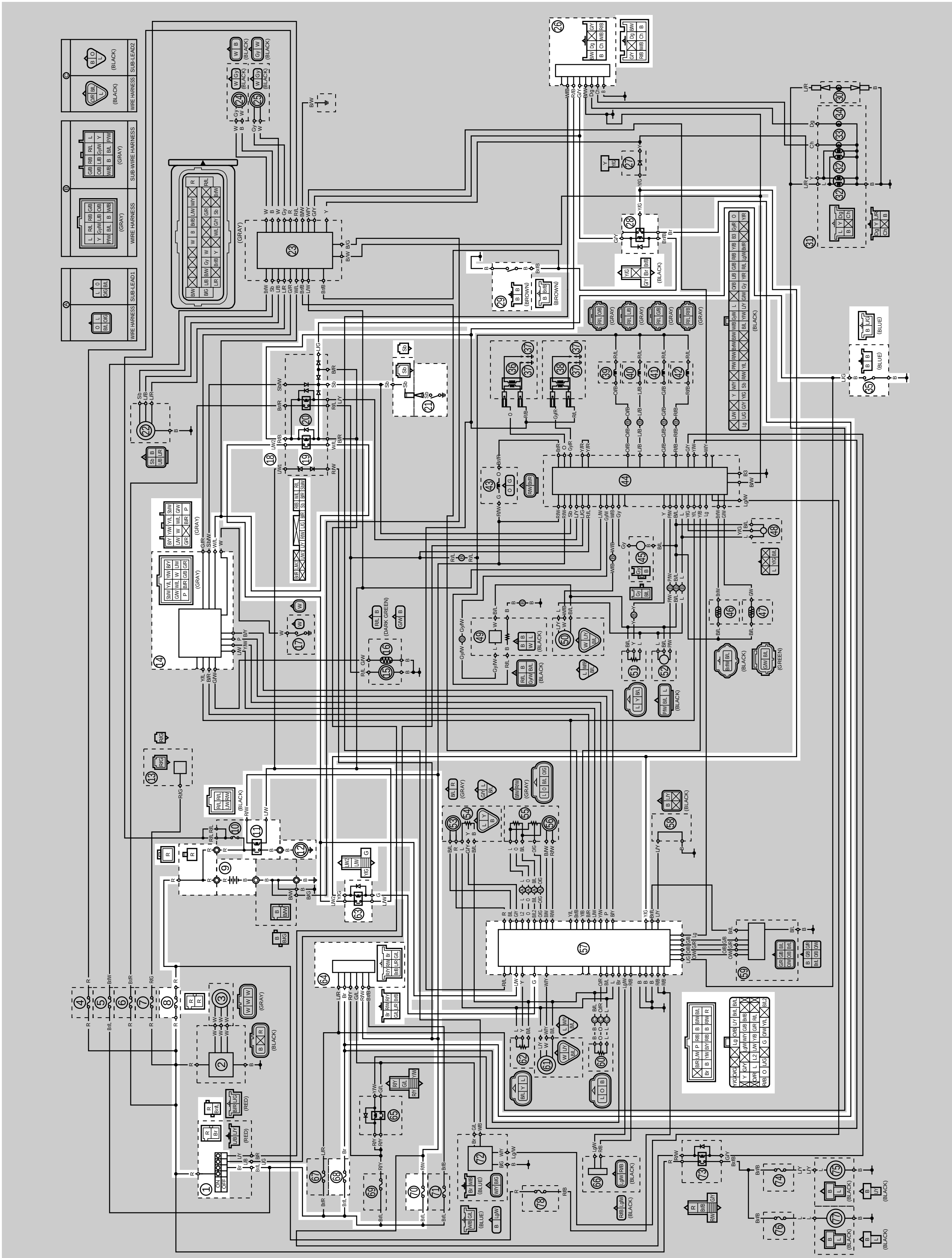
Front cowling wire harness



18. Coupler 2 (wire harness–front cowling wire harness)
19. Coupler 3 (wire harness–front cowling wire harness)
52. Coupler 4 (wire harness–front cowling wire harness)
68. Engine stop switch
69. Start switch
72. Clutch switch

ET3P66005

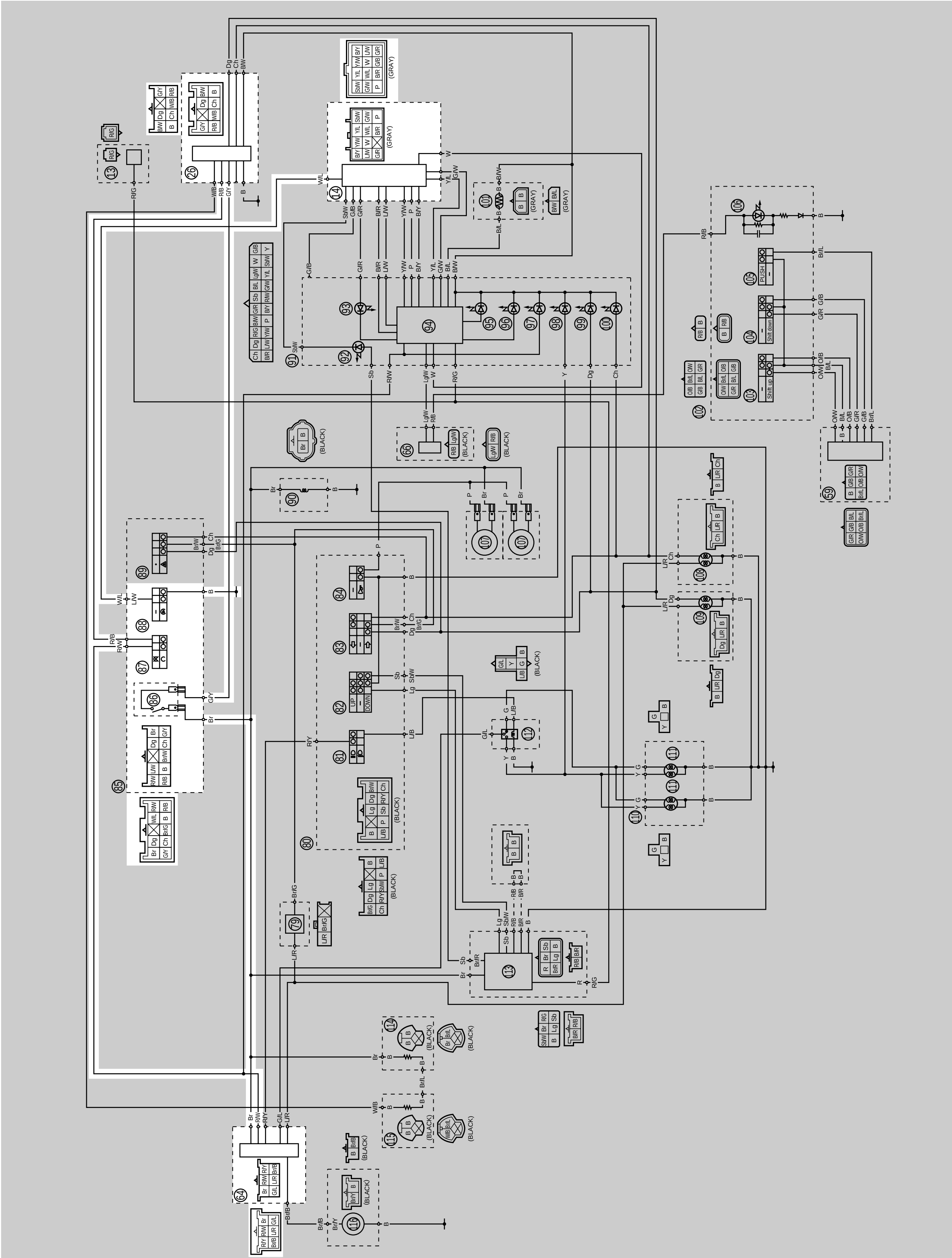
CIRCUIT DIAGRAM (1/2) (FJR13AE)



1. Main switch
8. Main fuse
9. Battery
11. Starter relay
12. Starter motor
14. Coupler 2 (wire harness–front cowling wire harness)
18. Relay unit
19. Starting circuit cut-off relay
21. Neutral switch
26. Coupler 3 (wire harness–front cowling wire harness)
28. Brake light relay
29. Rear brake light switch
35. Sidestand switch
57. MCU (motor control unit)
63. YCC-S control relay
64. Coupler 5 (wire harness–front cowling wire harness)
68. Signaling system fuse
70. Ignition fuse

ET3P66006
CIRCUIT DIAGRAM (2/2) (FJR13AE)

Front cowling wire harness

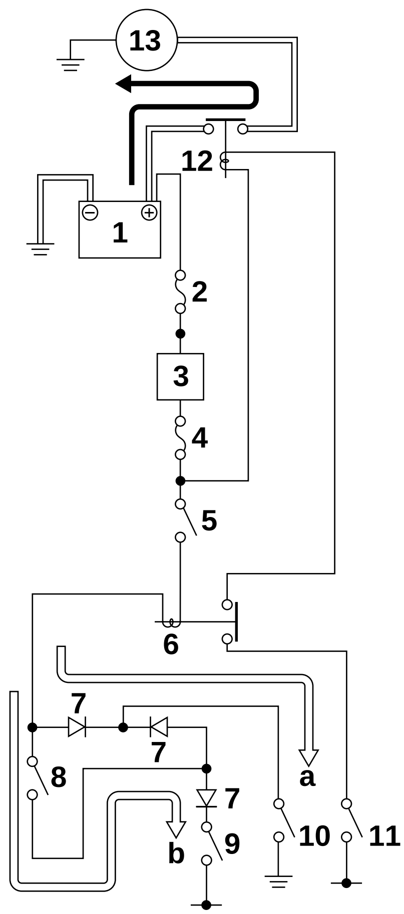


14. Coupler 2 (wire harness–front cowling wire harness)
26. Coupler 3 (wire harness–front cowling wire harness)
64. Coupler 5 (wire harness–front cowling wire harness)
86. Front brake light switch
87. Engine stop switch
88. Start switch

EAS27180
STARTING CIRCUIT CUT-OFF SYSTEM OPERATION (FJR13A)
If the engine stop switch is set to "◯" and the main switch is turned "ON" (both switch circuits are closed), the starter motor can only operate if at least one of the following conditions is met:

- The transmission is in neutral (the neutral circuit of the gear position switch is closed).
- The clutch lever is pulled to the handlebar (the clutch switch circuit is closed) and the sidestand is up (the sidestand switch circuit is closed).

The starting circuit cut-off relay prevents the starter motor from operating when neither of these conditions has been met. In this instance, the starting circuit cut-off relay stays open so current cannot reach the starter motor. When at least one of the above conditions has been met, the starting circuit cut-off relay is closed and the engine can be started by pushing the start switch "⊛".



a. WHEN THE TRANSMISSION IS IN NEUTRAL
b. WHEN THE SIDESTAND IS UP AND THE CLUTCH LEVER IS PULLED TO THE HANDLEBAR
1. Battery
2. Main fuse
3. Main switch
4. Ignition fuse
5. Engine stop switch
6. Starting circuit cut-off relay
7. Relay unit (diode)
8. Clutch switch
9. Sidestand switch
10. Gear position switch
11. Start switch
12. Starter relay
13. Starter motor

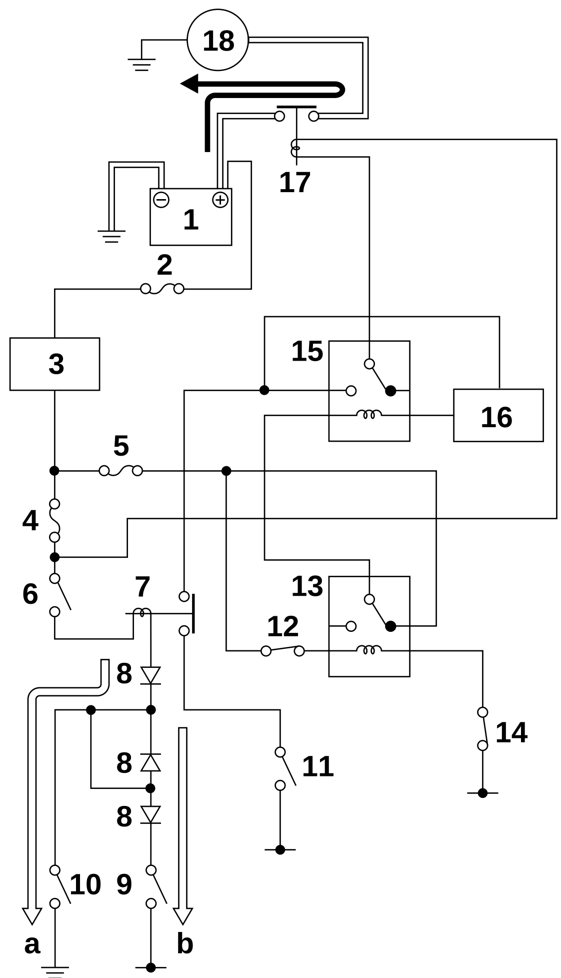
ET3P66007

STARTING CIRCUIT CUT-OFF SYSTEM OPERATION (FJR13AE)

If the engine stop switch is set to "◯" (the switch circuit is closed), the main switch is turned "ON" (the switch circuit is closed), and the brake lever is squeezed (the front brake light switch circuit is open) or the brake pedal is depressed (the rear brake light switch circuit is open), the starter motor can only operate if at least one of the following conditions is met:

- The transmission is in neutral (the neutral switch is closed).
- The sidestand is up (the sidestand switch circuit is closed).

The starting circuit cut-off relay prevents the starter motor from operating when neither of these conditions has been met. In this instance, the starting circuit cut-off relay stays open so current cannot reach the starter motor. When at least one of the above conditions has been met, the starting circuit cut-off relay is closed and the engine can be started by pushing the start switch "⊛".



a. WHEN THE TRANSMISSION IS IN NEUTRAL
b. WHEN THE SIDESTAND IS UP
1. Battery
2. Main fuse
3. Main switch
4. Ignition fuse
5. Signaling system fuse
6. Engine stop switch
7. Starting circuit cut-off relay
8. Relay unit (diode)
9. Sidestand switch
10. Neutral switch
11. Start switch
12. Front brake light switch
13. Brake light relay
14. Rear brake light switch
15. YCC-S control relay
16. MCU (motor control unit)
17. Starter relay
18. Starter motor

EAS27190

TROUBLESHOOTING (FJR13A)

The starter motor fails to turn.

TIP

- Before troubleshooting, remove the following part(s):

1. Front cowling assembly
2. Fuel tank
3. T-bar
4. Throttle bodies
5. Storage compartment

1. Check the fuses. (Main and ignition) Refer to “CHECKING THE FUSES” on page 8-227.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-228.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the starter motor operation. Refer to “CHECKING THE STARTER MOTOR OPERATION” on page 8-237.	OK →	Starter motor is OK. Perform the electric starting system troubleshooting, starting with step 5.
NG ↓		
4. Check the starter motor. Refer to “CHECKING THE STARTER MOTOR” on page 5-44.	NG →	Repair or replace the starter motor.
OK ↓		
5. Check the relay unit (starting circuit cut-off relay). Refer to “CHECKING THE RELAYS” on page 8-231.	NG →	Replace the relay unit.
OK ↓		
6. Check the relay unit (diode). Refer to “CHECKING THE RELAY UNIT (DIODE)” on page 8-234.	NG →	Replace the relay unit.
OK ↓		
7. Check the starter relay. Refer to “CHECKING THE RELAYS” on page 8-231.	NG →	Replace the starter relay.
OK ↓		

8. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the main switch.
OK ↓		
9. Check the engine stop switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the right handlebar switch.
OK ↓		
10. Check the gear position switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the gear position switch.
OK ↓		
11. Check the sidestand switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the sidestand switch.
OK ↓		
12. Check the clutch switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the clutch switch.
OK ↓		
13. Check the start switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the right handlebar switch.
OK ↓		
14. Check the entire starting system wiring. Refer to “CIRCUIT DIAGRAM (1/2) (FJR13A)” on page 8-13 and “CIRCUIT DIAGRAM (2/2) (FJR13A)” on page 8-15.	NG →	Properly connect or repair the starting system wiring.
OK ↓		
The starting system circuit is OK.		

ET3P66008

TROUBLESHOOTING (FJR13AE)

The starter motor fails to turn.

TIP

- Before troubleshooting, remove the following part(s):

1. Front cowling assembly
2. Fuel tank
3. T-bar
4. Throttle bodies
5. Storage compartment

1. Check the fuses. (Main, signaling system, and ignition) Refer to “CHECKING THE FUSES” on page 8-227.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-228.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the starter motor operation. Refer to “CHECKING THE STARTER MOTOR OPERATION” on page 8-237.	OK →	Starter motor is OK. Perform the electric starting system troubleshooting, starting with step 5.
NG ↓		
4. Check the starter motor. Refer to “CHECKING THE STARTER MOTOR” on page 5-44.	NG →	Repair or replace the starter motor.
OK ↓		
5. Check the relay unit (starting circuit cut-off relay). Refer to “CHECKING THE RELAYS” on page 8-231.	NG →	Replace the relay unit.
OK ↓		
6. Check the relay unit (diode). Refer to “CHECKING THE RELAY UNIT (DIODE)” on page 8-234.	NG →	Replace the relay unit.
OK ↓		
7. Check the starter relay. Refer to “CHECKING THE RELAYS” on page 8-231.	NG →	Replace the starter relay.
OK ↓		

Check	Result	Action
8. Check the brake light relay. Refer to “CHECKING THE RELAYS” on page 8-231.	NG →	Replace the brake light relay.
OK ↓		
9. Check the YCC-S control relay. Refer to “CHECKING THE RELAYS” on page 8-231.	NG →	Replace the YCC-S control relay.
OK ↓		
10. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the main switch.
OK ↓		
11. Check the engine stop switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the right handlebar switch.
OK ↓		
12. Check the neutral switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the neutral switch.
OK ↓		
13. Check the sidestand switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the sidestand switch.
OK ↓		
14. Check the front brake light switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the front brake light switch.
OK ↓		
15. Check the rear brake light switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the rear brake light switch.
OK ↓		
16. Check the start switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the right handlebar switch.
OK ↓		

17.Check the entire starting system wiring. Refer to “CIRCUIT DIAGRAM (1/2) (FJR13AE)” on page 8-17 and “CIRCUIT DIAGRAM (2/2) (FJR13AE)” on page 8-19.	NG →	Properly connect or repair the starting system wiring.

OK ↓

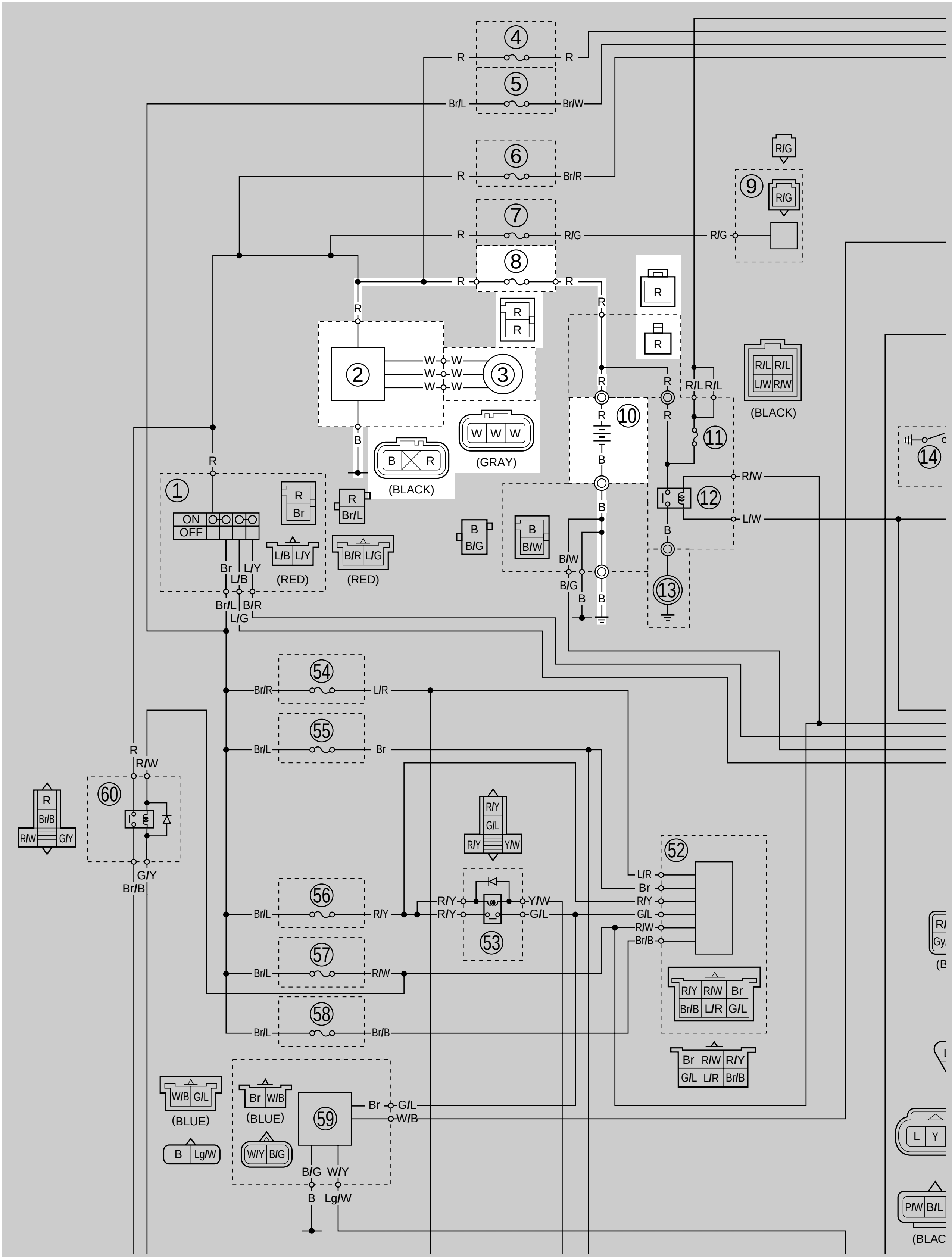
Replace the MCU.

EAS27200

CHARGING SYSTEM

EAS27210

CIRCUIT DIAGRAM



2. Rectifier/regulator
3. AC magneto
8. Main fuse
10. Battery

EAS27230

TROUBLESHOOTING

The battery is not being charged.

TIP

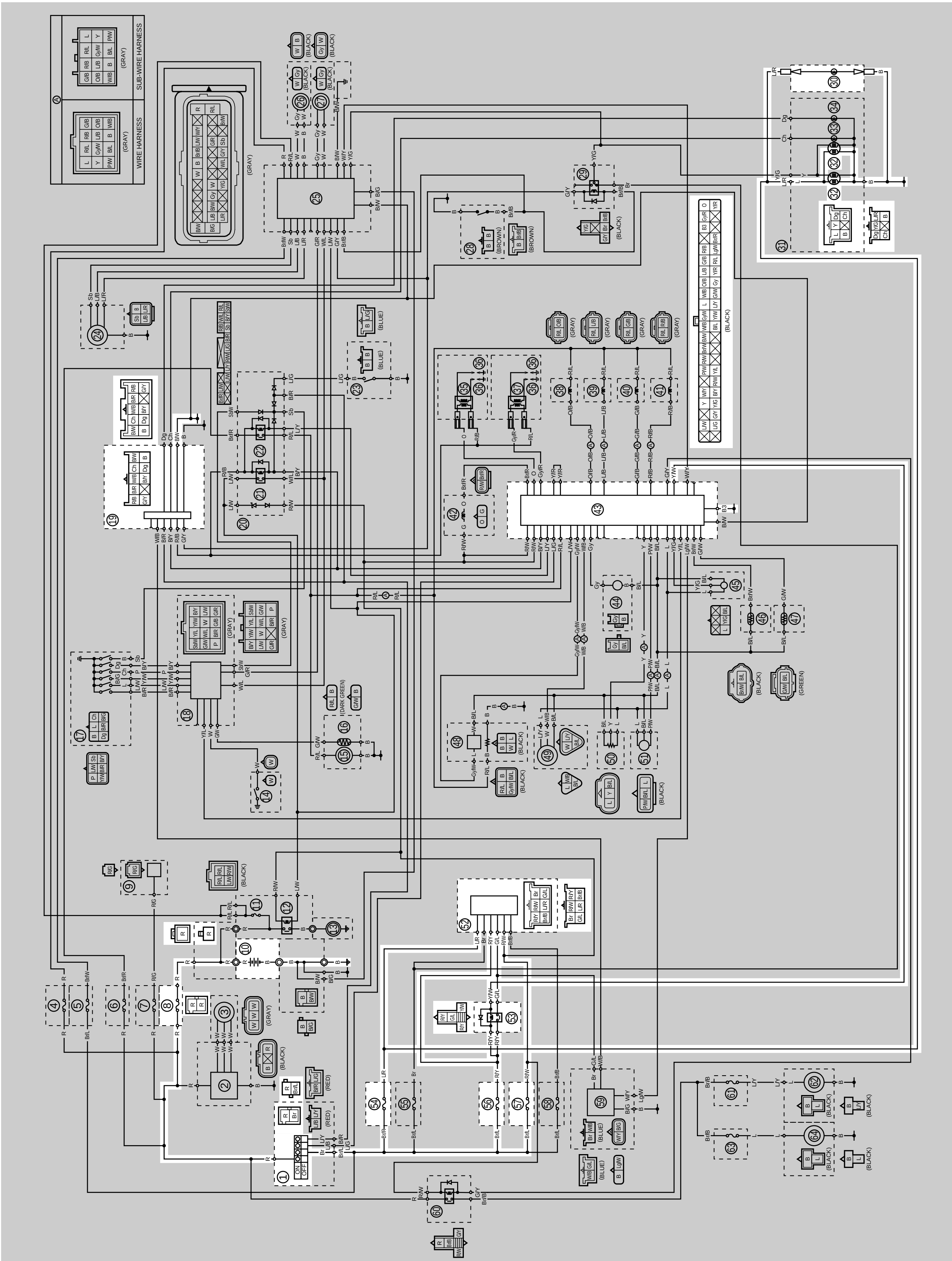
- Before troubleshooting, remove the following part(s):

1. Front cowling right inner panel 1

1. Check the fuse. (Main) Refer to “CHECKING THE FUSES” on page 8-227.	NG →	Replace the fuse.
OK ↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-228.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the stator coil. Refer to “CHECKING THE STATOR COIL” on page 8-237.	NG →	Replace the stator coil.
OK ↓		
4. Check the rectifier/regulator. Refer to “CHECKING THE RECTIFIER/REGULATOR” on page 8-238.	NG →	Replace the rectifier/regulator.
OK ↓		
5. Check the entire charging system wiring. Refer to “CIRCUIT DIAGRAM” on page 8-29.	NG →	Properly connect or repair the charging system wiring.
OK ↓		
The charging system circuit is OK.		

EAS27240
LIGHTING SYSTEM

EAS27250
CIRCUIT DIAGRAM (1/2)

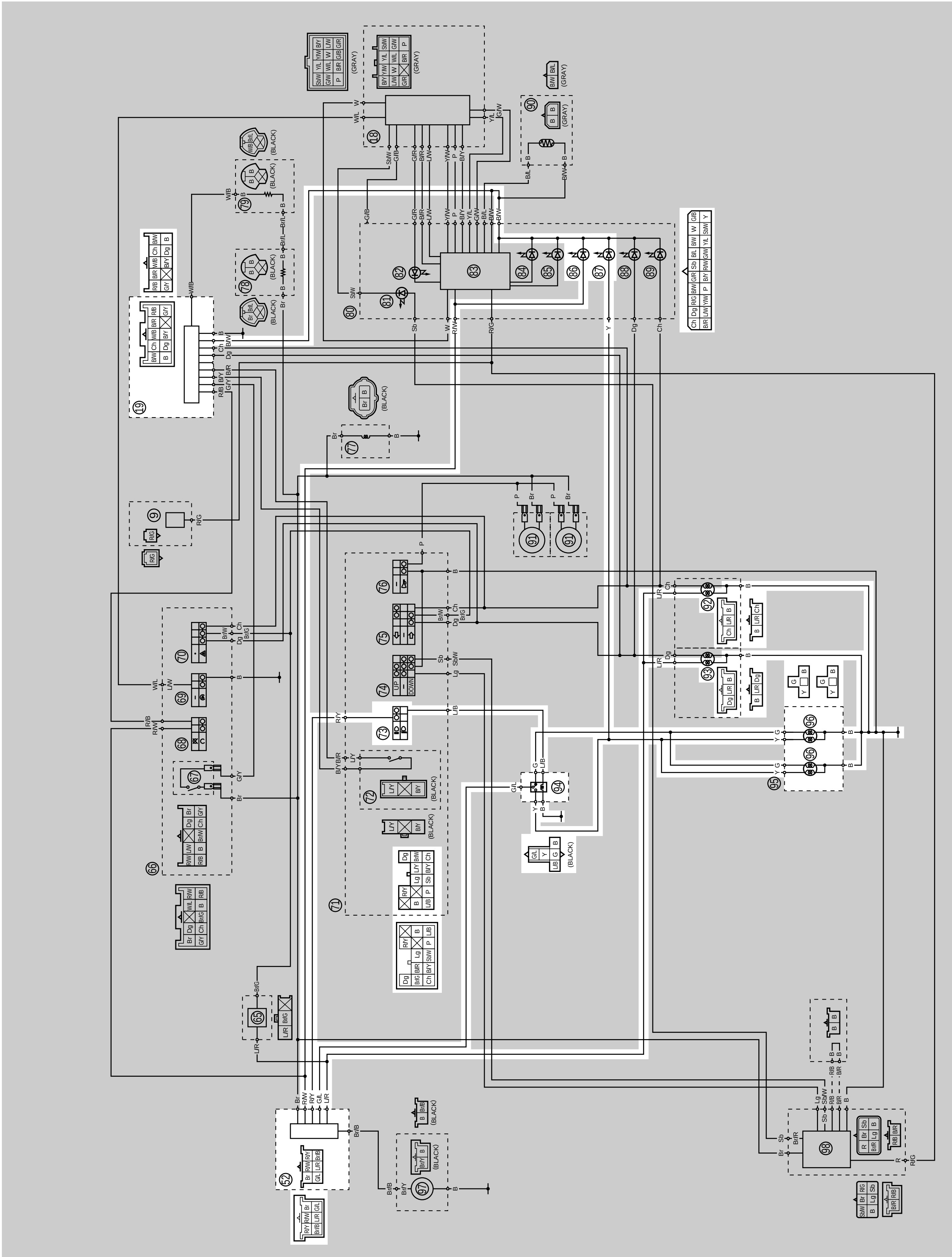


1. Main switch
8. Main fuse
10. Battery
19. Coupler 3 (wire harness–front cowling wire harness)
30. License plate light
32. Tail/brake light
43. ECU (engine control unit)
52. Coupler 4 (wire harness–front cowling wire harness)
53. Headlight (on/off)/grip warmer relay
54. Hazard lighting fuse
56. Headlight fuse
57. Ignition fuse

ET3P61004

CIRCUIT DIAGRAM (2/2)

Front cowling wire harness



19. Coupler 3 (wire harness–front cowling wire harness)
52. Coupler 4 (wire harness–front cowling wire harness)
73. Dimmer switch
86. Meter light
87. High beam indicator light
92. Front left turn signal/position light
93. Front right turn signal/position light
94. Headlight relay (dimmer)
96. Headlight

EAS27260

TROUBLESHOOTING

Any of the following fail to light: headlights, high beam indicator light, taillight, license plate light, position lights or meter light.

TIP

- Before troubleshooting, remove the following part(s):

1. Front cowling assembly
2. Fuel tank
3. T-bar

Check		Remedy
1. Check the condition of each bulb and bulb socket. Refer to “CHECKING THE BULBS AND BULB SOCKETS” on page 8-226.	NG →	Replace the bulb(s) and bulb socket(s).
OK ↓		
2. Check the fuses. (Main, headlight, ignition, and hazard lighting) Refer to “CHECKING THE FUSES” on page 8-227.	NG →	Replace the fuse(s).
OK ↓		
3. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-228.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
4. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the main switch.
OK ↓		
5. Check the dimmer switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the left handlebar switch.
OK ↓		
6. Check the pass switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the left handlebar switch.
OK ↓		
7. Check the headlight (on/off)/grip warmer relay. Refer to “CHECKING THE RELAYS” on page 8-231.	NG →	Replace the headlight (on/off)/grip warmer relay.
OK ↓		

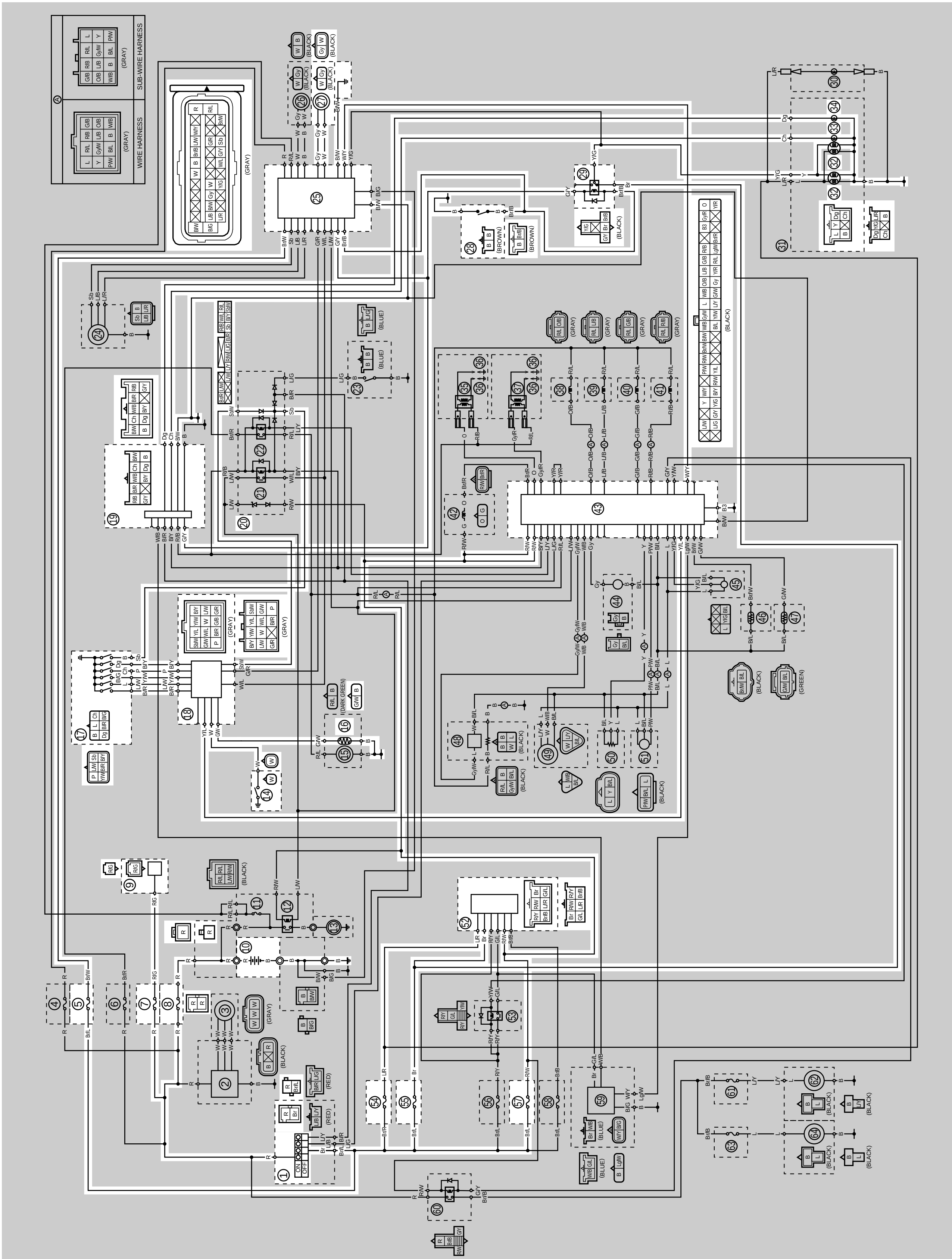
8. Check the headlight relay (dimmer). Refer to “CHECKING THE RELAYS” on page 8-231.	NG →	Replace the headlight relay (dimmer).
OK ↓		
9. Check the entire lighting system wiring. Refer to “CIRCUIT DIAGRAM (1/2)” on page 8-33 and “CIRCUIT DIAGRAM (2/2)” on page 8-35.	NG →	Properly connect or repair the lighting system wiring.
OK ↓		
Replace the ECU.		

EAS27270

SIGNALING SYSTEM

EAS27280

CIRCUIT DIAGRAM (1/2) (FJR13A)

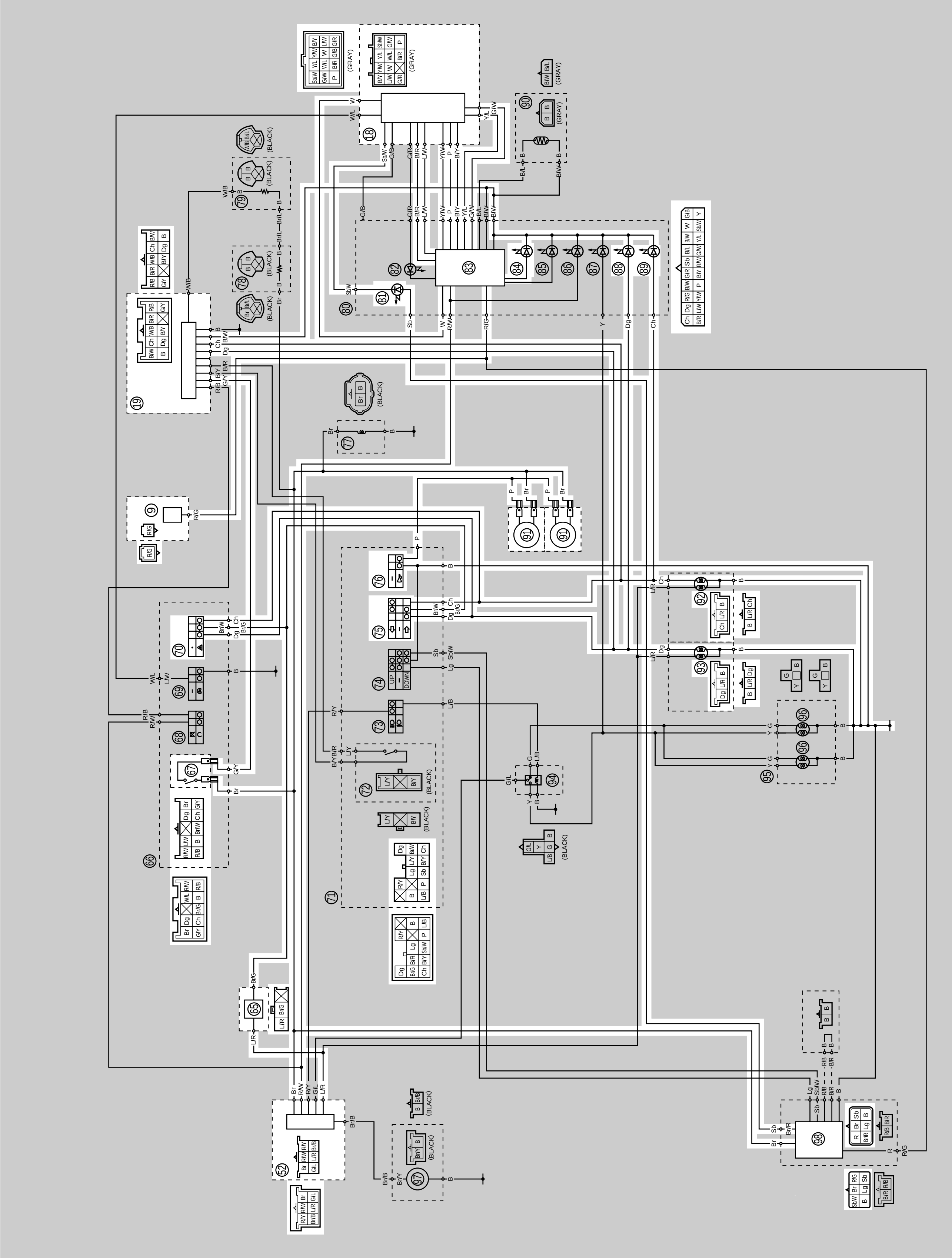


1. Main switch
5. ABS ECU fuse
7. Backup fuse (odometer, clock, and windshield drive system)
8. Main fuse
9. Coupler 1 (wire harness–front cowling wire harness)
10. Battery
14. Oil level switch
16. Fuel sender
17. Gear position switch
18. Coupler 2 (wire harness–front cowling wire harness)
19. Coupler 3 (wire harness–front cowling wire harness)
20. Relay unit
25. ABS ECU (electronic control unit)
27. Rear wheel sensor
28. Rear brake light switch
29. Brake light relay
32. Tail/brake light
33. Rear left turn signal light
34. Rear right turn signal light
43. ECU (engine control unit)
52. Coupler 4 (wire harness–front cowling wire harness)
54. Hazard lighting fuse
55. Signaling system fuse
57. Ignition fuse

ET3P61005

CIRCUIT DIAGRAM (2/2) (FJR13A)

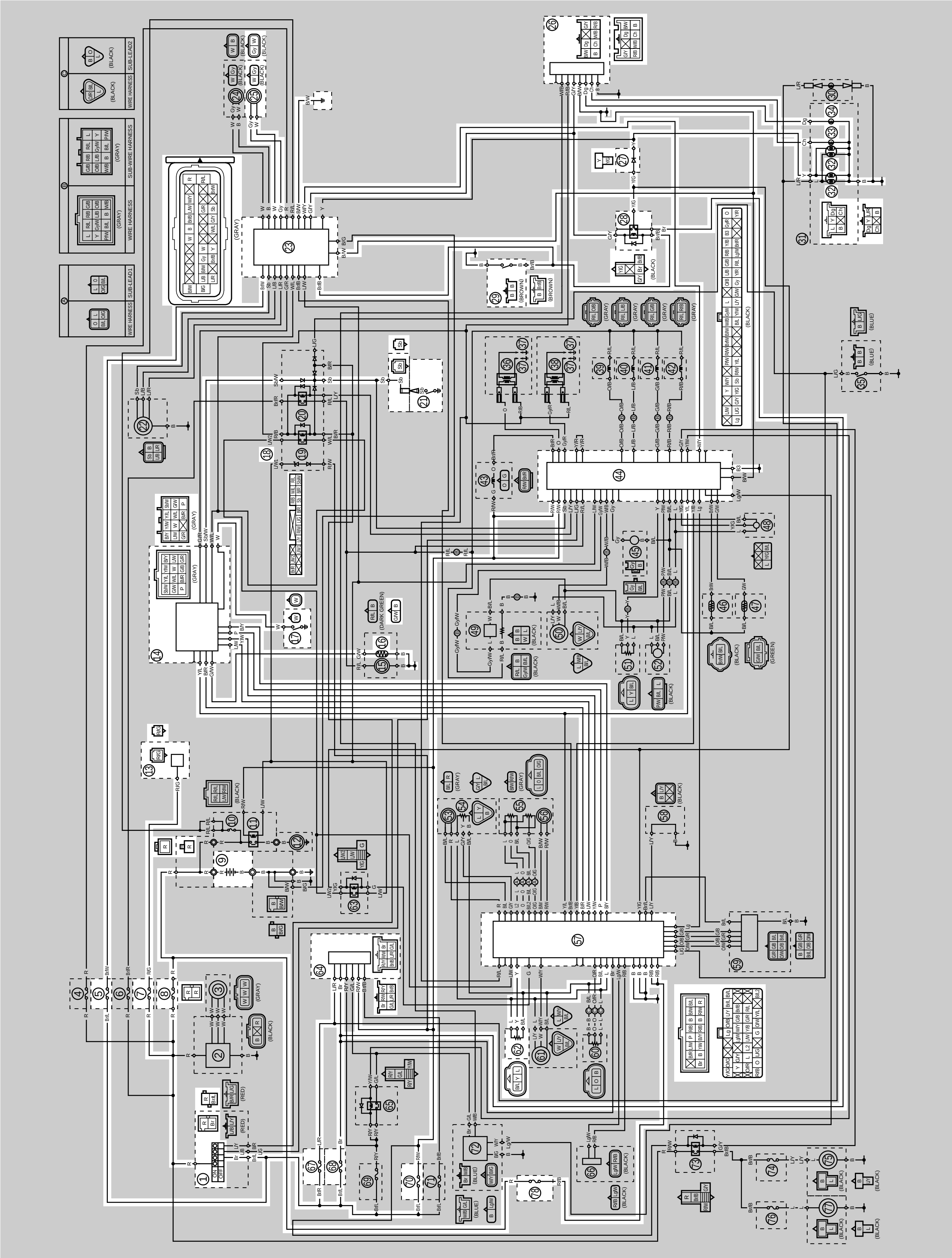
Front cowling wire harness



9. Coupler 1 (wire harness–front cowling wire harness)
18. Coupler 2 (wire harness–front cowling wire harness)
19. Coupler 3 (wire harness–front cowling wire harness)
52. Coupler 4 (wire harness–front cowling wire harness)
65. Turn signal/hazard relay
67. Front brake light switch
70. Hazard switch
75. Turn signal switch
76. Horn switch
81. Neutral indicator light
83. Multi-function meter
84. Oil level warning light
88. Right turn signal indicator light
89. Left turn signal indicator light
91. Horn
92. Front left turn signal/position light
93. Front right turn signal/position light
98. Windshield drive unit

ET3P66009

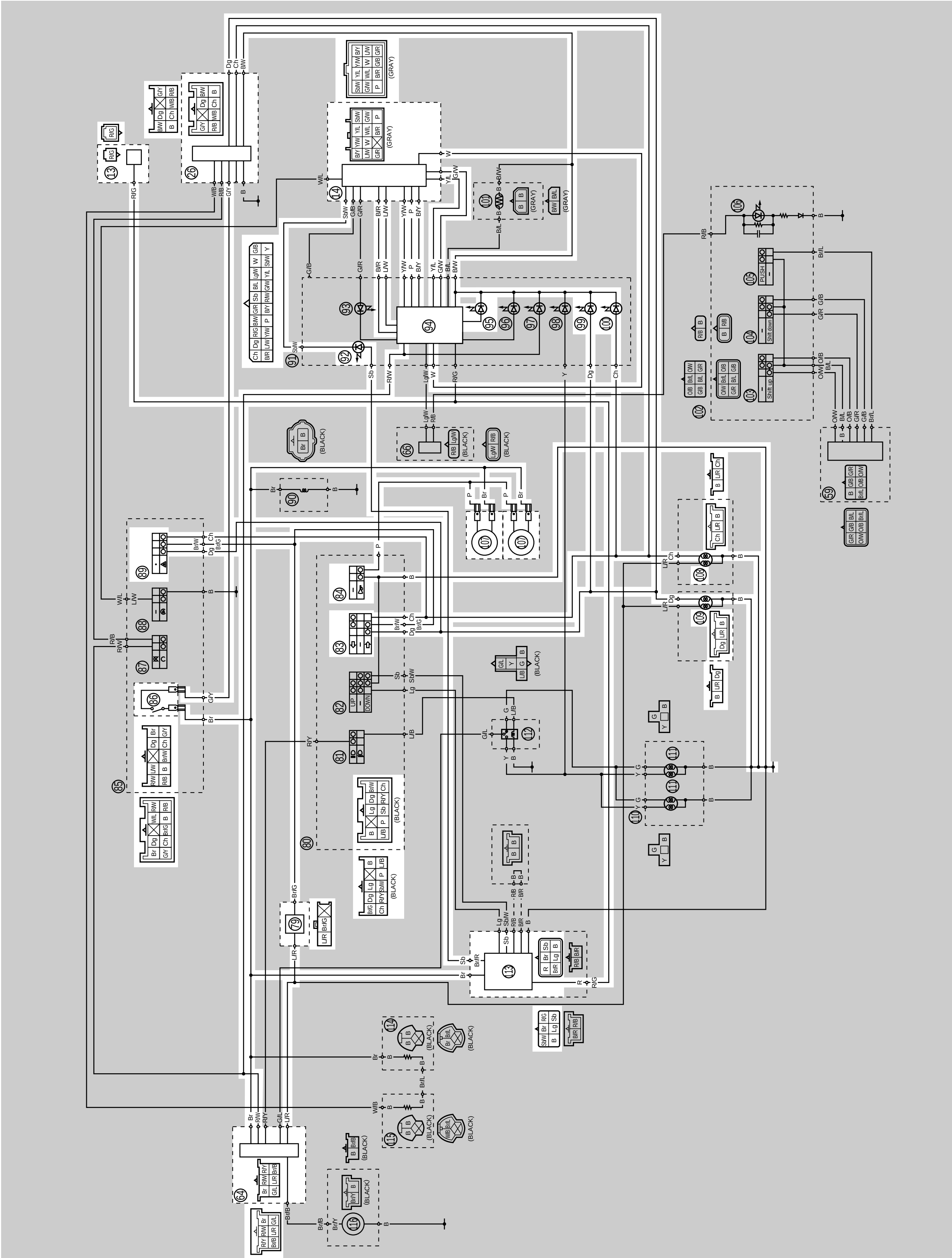
CIRCUIT DIAGRAM (1/2) (FJR13AE)



1. Main switch
5. ABS ECU fuse
7. Backup fuse (odometer, clock, and windshield drive system)
8. Main fuse
9. Battery
13. Coupler 1 (wire harness–front cowling wire harness)
14. Coupler 2 (wire harness–front cowling wire harness)
16. Fuel sender
17. Oil level switch
18. Relay unit
21. Neutral switch
23. ABS ECU (electronic control unit)
25. Rear wheel sensor
26. Coupler 3 (wire harness–front cowling wire harness)
27. Diode
28. Brake light relay
29. Rear brake light switch
32. Tail/brake light
33. Rear left turn signal light
34. Rear right turn signal light
44. ECU (engine control unit)
57. MCU (motor control unit)
62. Gear position sensor
64. Coupler 5 (wire harness–front cowling wire harness)
67. Hazard lighting fuse
68. Signaling system fuse
70. Ignition fuse
78. YCC-S motor control fuse

ET3P66010
CIRCUIT DIAGRAM (2/2) (FJR13AE)

Front cowling wire harness



13. Coupler 1 (wire harness–front cowling wire harness)
14. Coupler 2 (wire harness–front cowling wire harness)
26. Coupler 3 (wire harness–front cowling wire harness)
64. Coupler 5 (wire harness–front cowling wire harness)
79. Turn signal/hazard relay
83. Turn signal switch
84. Horn switch
86. Front brake light switch
89. Hazard switch
92. Neutral indicator light
94. Multi-function meter
95. Oil level warning light
99. Right turn signal indicator light
100. Left turn signal indicator light
107. Horn
108. Front left turn signal/position light
109. Front right turn signal/position light
113. Windshield drive unit

EAS27290

TROUBLESHOOTING

- Any of the following fail to light: turn signal light, brake light or indicator light.
- The horn fails to sound.
- The fuel meter fails to come on.
- The speedometer fails to operate.

TIP

- Before troubleshooting, remove the following part(s):

1. Front cowling assembly
2. Fuel tank
3. T-bar
4. Throttle bodies

1. Check the fuses. (Main, ignition, signaling system, hazard lighting, backup, ABS ECU, and YCC-S motor control (FJR13AE)) Refer to “CHECKING THE FUSES” on page 8-227.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-228.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the main switch.
OK ↓		
4. Check the entire signaling system wiring. Refer to “CIRCUIT DIAGRAM (1/2) (FJR13A)” on page 8-39, “CIRCUIT DIAGRAM (2/2) (FJR13A)” on page 8-41, “CIRCUIT DIAGRAM (1/2) (FJR13AE)” on page 8-43, and “CIRCUIT DIAGRAM (2/2) (FJR13AE)” on page 8-45.	NG →	Properly connect or repair the signaling system wiring.
OK ↓		
Check the condition of each of the signaling system circuits. Refer to “Checking the signaling system”.		

Checking the signaling system

The horn fails to sound.

Check	NG → Action
1. Check the horn switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG → Replace the left handlebar switch.

OK ↓

Check	NG → Action
2. Check the horns. Refer to “CHECKING THE HORNS” on page 8-238.	NG → Replace the horn(s).

OK ↓

Check	NG → Action
3. Check the entire signaling system wiring. Refer to “CIRCUIT DIAGRAM (1/2) (FJR13A)” on page 8-39, “CIRCUIT DIAGRAM (2/2) (FJR13A)” on page 8-41, “CIRCUIT DIAGRAM (1/2) (FJR13AE)” on page 8-43, and “CIRCUIT DIAGRAM (2/2) (FJR13AE)” on page 8-45.	NG → Properly connect or repair the signaling system wiring.

OK ↓

This circuit is OK.

The tail/brake light fails to come on.

Check	NG → Action
1. Check the tail/brake light bulbs and sockets. Refer to “CHECKING THE BULBS AND BULB SOCKETS” on page 8-226.	NG → Replace the tail/brake light bulb, socket or both.

OK ↓

Check	NG → Action
2. Check the front brake light switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG → Replace the front brake light switch.

OK ↓

Check	NG → Action
3. Check the rear brake light switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG → Replace the rear brake light switch.

OK ↓

Check	NG → Action
4. Check the brake light relay. Refer to “CHECKING THE RELAYS” on page 8-231.	NG → Replace the brake light relay.

OK ↓

Check	Result	Action
5. Check the diode 2. (FJR13AE only) Refer to “CHECKING THE DIODE (FJR13AE only)” on page 8-245.	NG →	Replace the diode.

OK ↓

Check	Result	Action
6. Check the entire signaling system wiring. Refer to “CIRCUIT DIAGRAM (1/2) (FJR13A)” on page 8-39, “CIRCUIT DIAGRAM (2/2) (FJR13A)” on page 8-41, “CIRCUIT DIAGRAM (1/2) (FJR13AE)” on page 8-43, and “CIRCUIT DIAGRAM (2/2) (FJR13AE)” on page 8-45.	NG →	Properly connect or repair the signaling system wiring.

OK ↓

This circuit is OK.

The turn signal light, turn signal indicator light or both fail to blink.

Check	Result	Action
1. Check the turn signal light bulbs and sockets. Refer to “CHECKING THE BULBS AND BULB SOCKETS” on page 8-226.	NG →	Replace the turn signal light bulb, socket or both.

OK ↓

Check	Result	Action
2. Check the turn signal switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the left handlebar switch.

OK ↓

Check	Result	Action
3. Check the hazard switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the right handlebar switch.

OK ↓

Check	Result	Action
4. Check the turn signal/hazard relay. Refer to “CHECKING THE TURN SIGNAL/HAZARD RELAY” on page 8-233.	NG →	Replace the turn signal/hazard relay.

OK ↓

Check		Result
5. Check the entire signaling system wiring. Refer to “CIRCUIT DIAGRAM (1/2) (FJR13A)” on page 8-39, “CIRCUIT DIAGRAM (2/2) (FJR13A)” on page 8-41, “CIRCUIT DIAGRAM (1/2) (FJR13AE)” on page 8-43, and “CIRCUIT DIAGRAM (2/2) (FJR13AE)” on page 8-45.	NG →	Properly connect or repair the signaling system wiring.
OK ↓		
This circuit is OK.		

The neutral indicator light fails to come on.

Check		Result
1. Check the gear position switch. (FJR13A) Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the gear position switch.
OK ↓		
2. Check the neutral switch. (FJR13AE) Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the neutral switch.
OK ↓		
3. Check the relay unit (diode). Refer to “CHECKING THE RELAY UNIT (DIODE)” on page 8-234.	NG →	Replace the relay unit.
OK ↓		
4. Check the entire signaling system wiring. Refer to “CIRCUIT DIAGRAM (1/2) (FJR13A)” on page 8-39, “CIRCUIT DIAGRAM (2/2) (FJR13A)” on page 8-41, “CIRCUIT DIAGRAM (1/2) (FJR13AE)” on page 8-43, and “CIRCUIT DIAGRAM (2/2) (FJR13AE)” on page 8-45.	NG →	Properly connect or repair the signaling system wiring.
OK ↓		
Replace the windshield drive unit.		

The shift indicator fails to come on. (FJR13A)

Check		Result
1. Check the gear position switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the gear position switch.
OK ↓		

2. Check the entire signaling system wiring. Refer to “CIRCUIT DIAGRAM (1/2) (FJR13A)” on page 8-39 and “CIRCUIT DIAGRAM (2/2) (FJR13A)” on page 8-41.	NG →	Properly connect or repair the signaling system wiring.
OK ↓		
Replace the meter assembly.		

The oil level warning light fails to come on.

1. Check the oil level switch. Refer to “CHECKING THE OIL LEVEL SWITCH” on page 8-239.	NG →	Replace the oil level switch.
OK ↓		
2. Check the entire signaling system wiring. Refer to “CIRCUIT DIAGRAM (1/2) (FJR13A)” on page 8-39, “CIRCUIT DIAGRAM (2/2) (FJR13A)” on page 8-41, “CIRCUIT DIAGRAM (1/2) (FJR13AE)” on page 8-43, and “CIRCUIT DIAGRAM (2/2) (FJR13AE)” on page 8-45.	NG →	Properly connect or repair the signaling system wiring.
OK ↓		
Replace the meter assembly.		

The fuel meter fails to come on.

1. Check the fuel sender. Refer to “CHECKING THE FUEL SENDER” on page 8-239.	NG →	Replace the fuel pump.
OK ↓		
2. Check the entire signaling system wiring. Refer to “CIRCUIT DIAGRAM (1/2) (FJR13A)” on page 8-39, “CIRCUIT DIAGRAM (2/2) (FJR13A)” on page 8-41, “CIRCUIT DIAGRAM (1/2) (FJR13AE)” on page 8-43, and “CIRCUIT DIAGRAM (2/2) (FJR13AE)” on page 8-45.	NG →	Properly connect or repair the signaling system wiring.
OK ↓		
Replace the meter assembly.		

The speedometer fails to operate.

Step		Result
1. Check the rear wheel sensor. Refer to “MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR” on page 4-28.	NG →	Replace the rear wheel sensor.
OK ↓		
2. Check the entire speed sensor wiring. Refer to NOTE.	NG →	Properly connect or repair the speed sensor wiring.
OK ↓		
Replace the hydraulic unit assembly, ECU or meter assembly.		

TIP

Repair or replace if there is an open or short circuit.

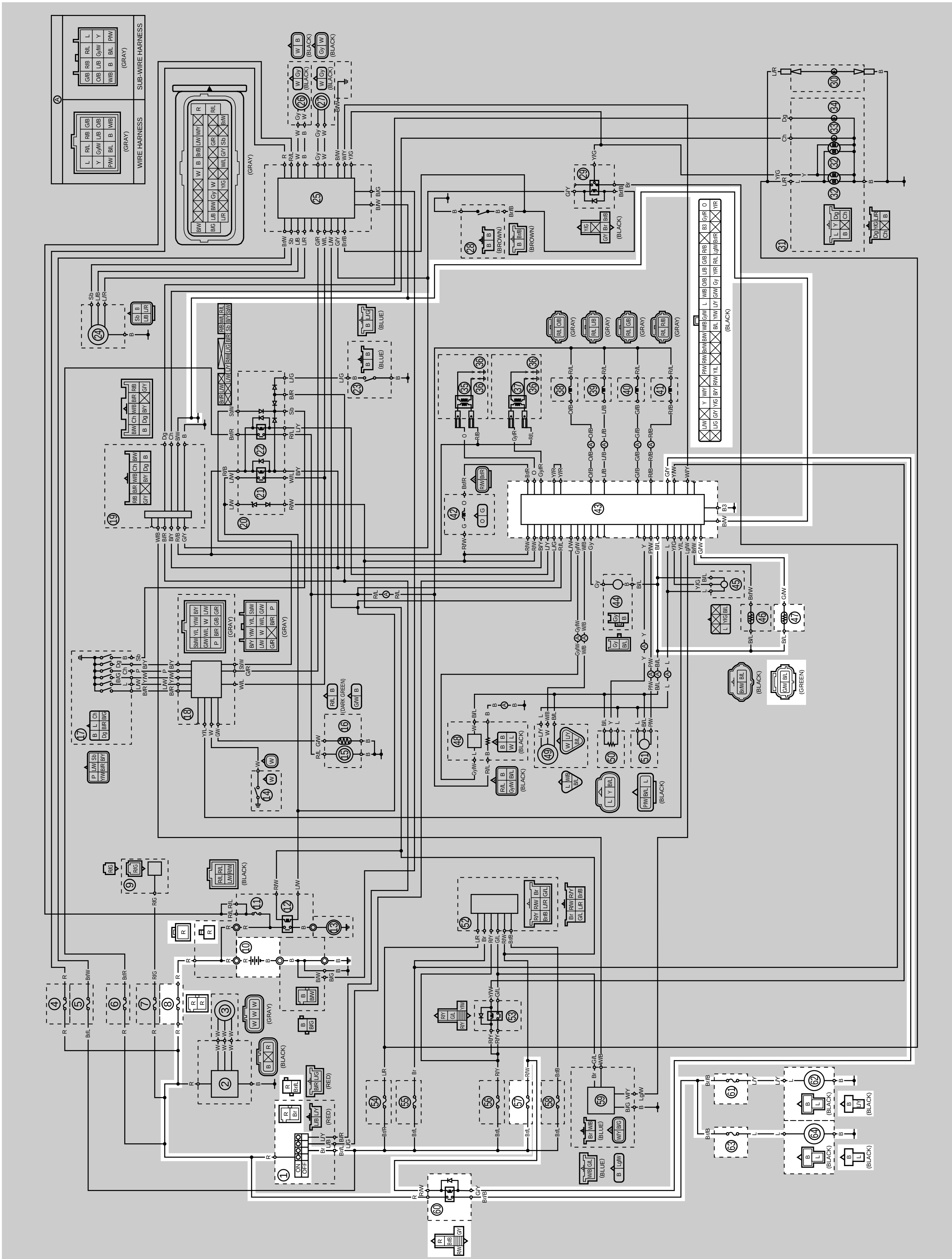
- Between rear wheel sensor coupler and ABS ECU coupler.
  (white–white)
  (gray–gray)
- Between ABS ECU coupler and ECU coupler.
  (white/yellow–white/yellow)
- Between ECU coupler and meter assembly coupler.
  (yellow/blue–yellow/blue)

EAS27300

COOLING SYSTEM

EAS27310

CIRCUIT DIAGRAM



1. Main switch
8. Main fuse
10. Battery
43. ECU (engine control unit)
47. Coolant temperature sensor
57. Ignition fuse
60. Radiator fan motor relay
61. Left radiator fan motor fuse
62. Left radiator fan motor
63. Right radiator fan motor fuse
64. Right radiator fan motor

EAS27320

TROUBLESHOOTING

The radiator fan motor fails to turn.

TIP

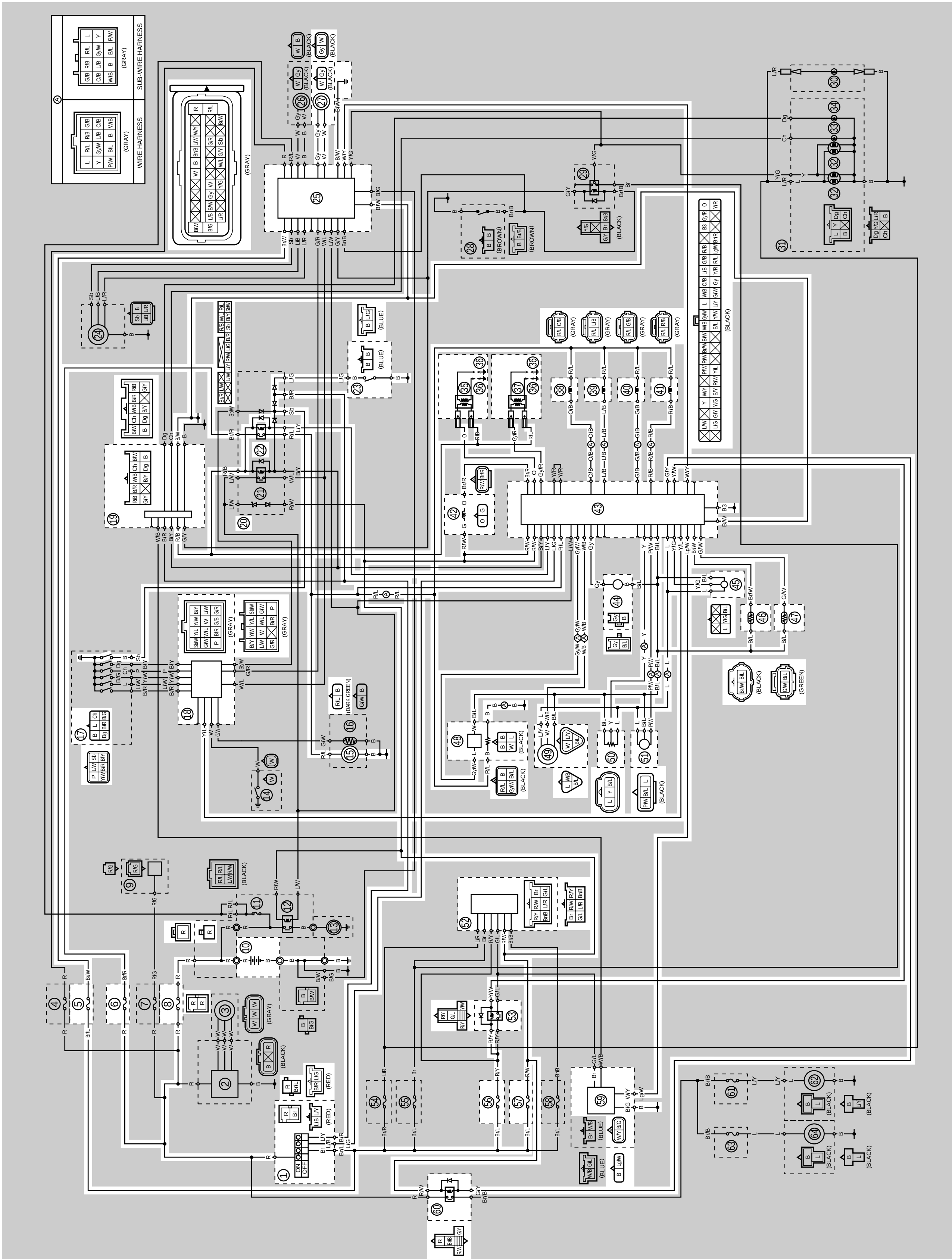
- Before troubleshooting, remove the following part(s):

1. Front cowling assembly
2. Fuel tank
3. T-bar

Check		Action
1. Check the fuses. (Main, ignition, left radiator fan motor, and right radiator fan motor) Refer to “CHECKING THE FUSES” on page 8-227.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-228.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the main switch.
OK ↓		
4. Check the radiator fan motors. Refer to “CHECKING THE RADIATOR FAN MOTORS” on page 8-240.	NG →	Replace the radiator fan motor(s).
OK ↓		
5. Check the radiator fan motor relay. Refer to “CHECKING THE RELAYS” on page 8-231.	NG →	Replace the radiator fan motor relay.
OK ↓		
6. Check the coolant temperature sensor. Refer to “CHECKING THE COOLANT TEMPERATURE SENSOR” on page 8-240.	NG →	Replace the coolant temperature sensor.
OK ↓		
7. Check the entire cooling system wiring. Refer to “CIRCUIT DIAGRAM” on page 8-53.	NG →	Properly connect or repair the cooling system wiring.
OK ↓		
Replace the ECU.		

EAS27330
FUEL INJECTION SYSTEM

EAS27340
CIRCUIT DIAGRAM (1/2) (FJR13A)

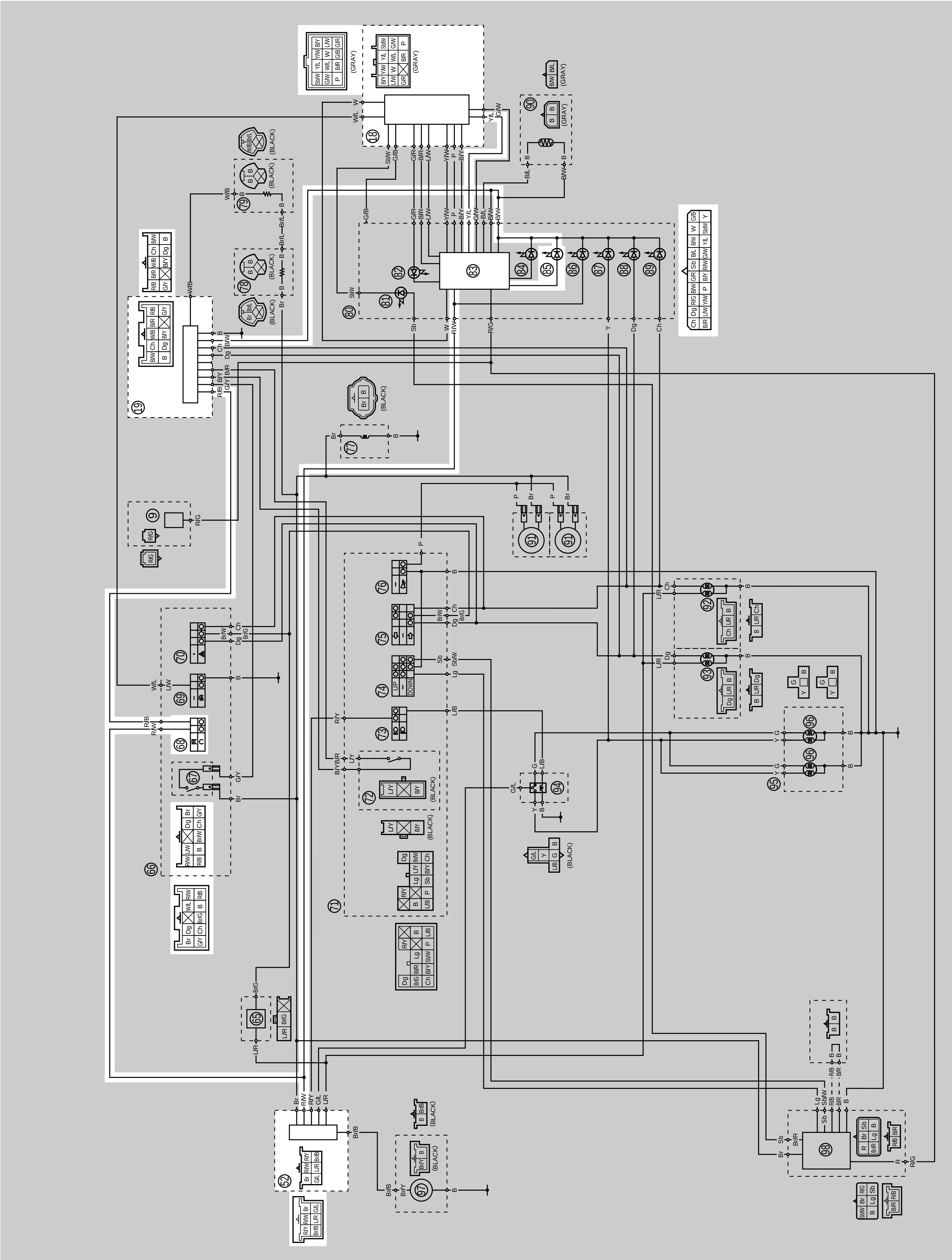


1. Main switch
5. ABS ECU fuse
6. Fuel injection system fuse
8. Main fuse
10. Battery
15. Fuel pump
17. Gear position switch
18. Coupler 2 (wire harness–front cowling wire harness)
19. Coupler 3 (wire harness–front cowling wire harness)
20. Relay unit
22. Fuel pump relay
23. Sidestand switch
25. ABS ECU (electronic control unit)
27. Rear wheel sensor
35. Cylinders-#1/#4 ignition coil
36. Spark plug
37. Cylinders-#2/#3 ignition coil
38. Injector #4
39. Injector #3
40. Injector #2
41. Injector #1
42. Air induction system solenoid
43. ECU (engine control unit)
44. Crankshaft position sensor
45. Lean angle sensor
46. Intake air temperature sensor
47. Coolant temperature sensor
48. O_2 sensor
49. Cylinder identification sensor
50. Throttle position sensor
51. Intake air pressure sensor
52. Coupler 4 (wire harness–front cowling wire harness)
53. Headlight (on/off)/grip warmer relay
56. Headlight fuse
57. Ignition fuse
59. Grip warmer control unit (OPTION)
60. Radiator fan motor relay

ET3P61006

CIRCUIT DIAGRAM (2/2) (FJR13A)

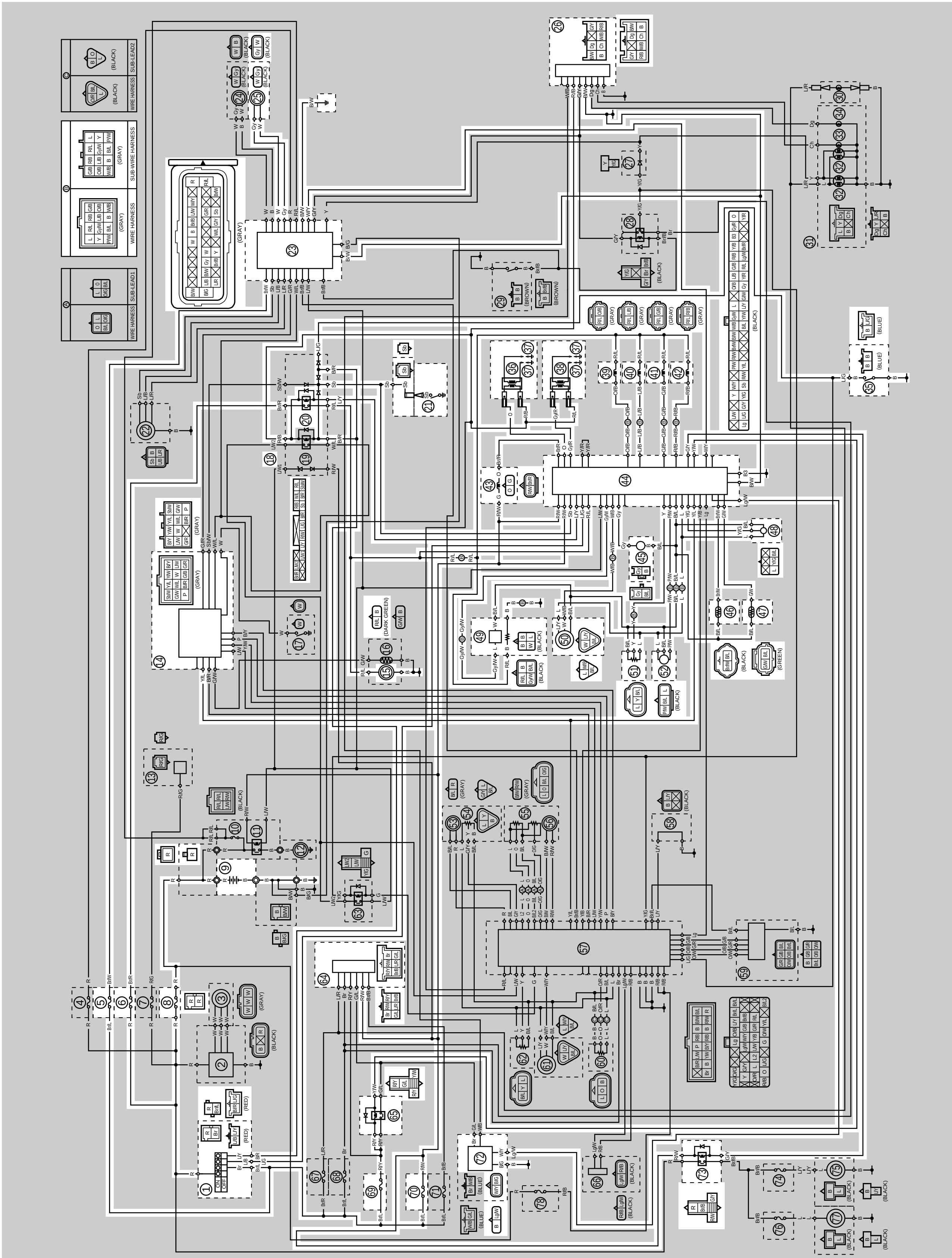
Front cowling wire harness



18. Coupler 2 (wire harness–front cowling wire harness)
19. Coupler 3 (wire harness–front cowling wire harness)
52. Coupler 4 (wire harness–front cowling wire harness)
68. Engine stop switch
83. Multi-function meter
85. Engine trouble warning light

ET3P66012

CIRCUIT DIAGRAM (1/2) (FJR13AE)

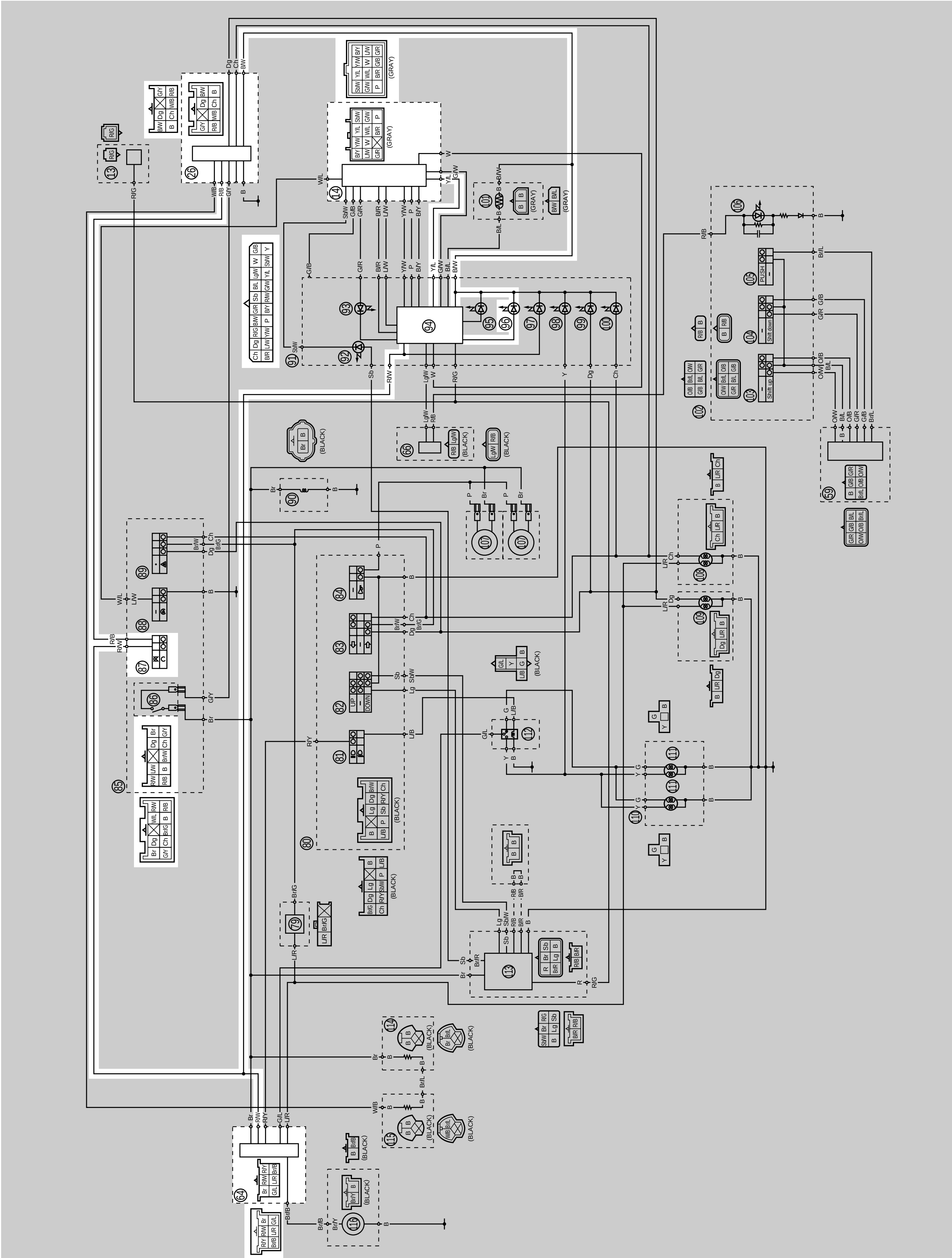


1. Main switch
5. ABS ECU fuse
6. Fuel injection system fuse
8. Main fuse
9. Battery
14. Coupler 2 (wire harness–front cowling wire harness)
15. Fuel pump
18. Relay unit
20. Fuel pump relay
21. Neutral switch
23. ABS ECU (electronic control unit)
25. Rear wheel sensor
26. Coupler 3 (wire harness–front cowling wire harness)
35. Sidestand switch
36. Cylinders-#1/#4 ignition coil
37. Spark plug
38. Cylinders-#2/#3 ignition coil
39. Injector #4
40. Injector #3
41. Injector #2
42. Injector #1
43. Air induction system solenoid
44. ECU (engine control unit)
45. Crankshaft position sensor
46. Intake air temperature sensor
47. Coolant temperature sensor
48. Lean angle sensor
49. O_2 sensor
50. Cylinder identification sensor
51. Throttle position sensor
52. Intake air pressure sensor
64. Coupler 5 (wire harness–front cowling wire harness)
65. Headlight (on/off)/grip warmer relay
69. Headlight fuse
70. Ignition fuse
72. Grip warmer control unit
73. Radiator fan motor relay

ET3P66013

CIRCUIT DIAGRAM (2/2) (FJR13AE)

Front cowling wire harness



14. Coupler 2 (wire harness–front cowling wire harness)
26. Coupler 3 (wire harness–front cowling wire harness)
64. Coupler 5 (wire harness–front cowling wire harness)
87. Engine stop switch
94. Multi-function meter
96. Engine trouble warning light

EAS27350

ECU SELF-DIAGNOSTIC FUNCTION

The ECU is equipped with a self-diagnostic function in order to ensure that the fuel injection system is operating normally. If this function detects a malfunction in the system, it immediately operates the engine under substitute characteristics and illuminates the engine trouble warning light to alert the rider that a malfunction has occurred in the system. Once a malfunction has been detected, a fault code is stored in the memory of the ECU.

- To inform the rider that the fuel injection system is not functioning, the engine trouble warning light flashes when the start switch is being pushed to start the engine.
- If a malfunction is detected in the system by the self-diagnostic function, the ECU provides an appropriate substitute characteristic operation, and alerts the rider of the detected malfunction by illuminating the engine trouble warning light.
- After the engine has been stopped, the lowest fault code number appears on the odometer/tripmeter/fuel reserve tripmeter LCD. Once a fault code has been displayed, it remains stored in the memory of the ECU until it is deleted.

Engine trouble warning light indication and fuel injection system operation

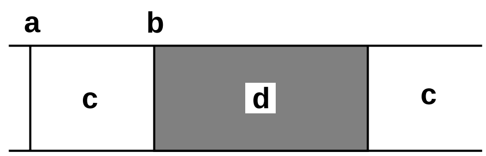
Warning light indication	ECU operation	Fuel injection operation	Vehicle operation
Flashing*	Warning provided when unable to start engine	Operation stopped	Cannot be operated
Remains on	Malfunction detected	Operated with substitute characteristics in accordance with the description of the malfunction	Can or cannot be operated depending on the fault code

* The warning light flashes when any one of the conditions listed below is present and the start switch is pushed:

11:	Cylinder identification sensor	33:	Cylinders-#1/#4 ignition coil (faulty ignition)
12:	Crankshaft position sensor	34:	Cylinders-#2/#3 ignition coil (faulty ignition)
19:	Black/red ECU lead (broken or disconnected)	41:	Lean angle sensor (open or short-circuit)
30:	Lean angle sensor (latch up detected)	50:	ECU internal malfunction (memory check error)

Checking the engine trouble warning light

The engine trouble warning light comes on for 1.4 seconds after the main switch has been turned to “ON” and it comes on while the start switch is being pushed. If the warning light does not come on under these conditions, the warning light (LED) may be defective.



a. Main switch “OFF”
b. Main switch “ON”
c. Engine trouble warning light off
d. Engine trouble warning light on for 1.4 seconds

EAS27380

SELF-DIAGNOSTIC FUNCTION TABLE

If the ECU detects an abnormal signal from a sensor while the vehicle is being driven, the ECU illuminates the engine trouble warning light and provides the engine with alternate operating instructions that are appropriate for the type of malfunction.
When an abnormal signal is received from a sensor, the ECU processes the specified values that are programmed for each sensor in order to provide the engine with alternate operating instructions that enable the engine to continue to operate or stop operating, depending on the conditions.

Self-Diagnostic Function table

Fault code No.	Item	Symptom	Able / unable to start	Able / unable to drive
11	Cylinder identification sensor	No normal signals are received from the cylinder identification sensor.	Unable	Unable
12	Crankshaft position sensor	No normal signals are received from the crankshaft position sensor.	Unable	Unable
13	Intake air pressure sensor (open or short circuit)	Intake air pressure sensor: open or short circuit detected.	Able	Able
14	Intake air pressure sensor (hose line)	Intake air pressure sensor: hose system malfunction (clogged or detached hose).	Able	Able
15	Throttle position sensor (open or short circuit)	Throttle position sensor: open or short circuit detected.	Able	Able
16	Throttle position sensor (stuck)	Stuck throttle position sensor is detected.	Able	Able
19	Black/red ECU lead (broken or disconnected)	A break or disconnection of the black/red lead of the ECU is detected.	Unable	Unable
21	Coolant temperature sensor	Coolant temperature sensor: open or short circuit detected.	Able	Able

Fault code No.	Item	Symptom	Able / unable to start	Able / unable to drive
22	Intake air temperature sensor (open or short circuit)	Intake air temperature sensor: open or short circuit detected.	Able	Able
24	O_2 sensor (inactive)	No normal signal is received from the O_2 sensor.	Able	Able
30	Lean angle sensor	Latch up detected. No normal signal is received from the lean angle sensor.	Unable	Unable
31	O_2 sensor (compensation stuck to upper limit)	The amount of air-fuel ratio feedback compensation is maintained continuously in the vicinity of the upper limit (lean air-fuel ratio).	Able	Able
32	O_2 sensor (compensation stuck to lower limit)	The amount of air-fuel ratio feedback compensation is maintained continuously in the vicinity of the lower limit (rich air-fuel ratio).	Able	Able
33	Cylinders-#1/#4 ignition coil (faulty ignition)	Malfunction detected in the primary wire of the cylinders-#1/#4 ignition coil.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)
34	Cylinders-#2/#3 ignition coil (faulty ignition)	Malfunction detected in the primary wire of the cylinders-#2/#3 ignition coil.	Able (depending on the number of faulty cylinders)	Able (depending on the number of faulty cylinders)
41	Lean angle sensor (open or short circuit)	Lean angle sensor: open or short circuit detected.	Unable	Unable
42	Rear wheel sensor	No normal signals are received from the rear wheel sensor.	Able	Able
	Gear position switch (neutral circuit) (FJR13A)	Open or short circuit is detected in the neutral circuit of the gear position switch.		
	Neutral switch (FJR13AE)	Open or short circuit is detected in the neutral switch.		
43	Fuel system voltage (monitoring voltage)	The ECU is unable to monitor the battery voltage (an open or short circuit in the line to the ECU).	Able	Able
44	Error in writing the amount of CO adjustment on EEPROM	An error is detected while reading or writing on EEPROM (CO adjustment value).	Able	Able
46	Vehicle system power supply (monitoring voltage)	Power supply to the fuel injection system is not normal.	Able	Able

Fault code No.	Item	Symptom	Able / unable to start	Able / unable to drive
50	ECU internal malfunction	Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)	Unable	Unable
70	Engine idling stop	Engine has been left idling. (The ECU automatically stops the engine after 20 minutes if it is left idling.)	Able	Able

Communication error with the meter

Fault code No.	Item	Symptom	Able / unable to start	Able / unable to drive
Er-1	ECU internal malfunction (output signal error)	No signals are received from the ECU.	Unable	Unable
Er-2	ECU internal malfunction (output signal error)	No signals are received from the ECU within the specified duration.	Unable	Unable
Er-3	ECU internal malfunction (output signal error)	Data from the ECU cannot be received correctly.	Unable	Unable
Er-4	ECU internal malfunction (input signal error)	Non-registered data has been received from the meter.	Unable	Unable

EAS27400

TROUBLESHOOTING METHOD

The engine operation is not normal and the engine trouble warning light comes on.

1. Check:
   - Fault code number

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Check the fault code number displayed on the meter.
b. Identify the faulty system with the fault code. Refer to “Self-Diagnostic Function table”.
c. Identify the probable cause of the malfunction. Refer to “Fault code table”.

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2. Check and repair the probable cause of malfunction.

Fault code No.	No fault code No.
Check and repair. Refer to “TROUBLESHOOTING DETAILS” on page 8-76. Monitor the operation of the sensors and actuators in the diagnostic mode. Refer to “Sensor operation table” and “Actuator operation table”.	Check and repair.

3. Perform fuel injection system reinstatement action.
   Refer to “Reinstatement method” of table in “TROUBLESHOOTING DETAILS”.

4. Turn the main switch to “OFF” and back to “ON”, then check that no fault code number is displayed.

TIP

If fault codes are displayed, repeat steps (1) to (4) until no fault code number is displayed.

5. Erase the malfunction history in the diagnostic mode. Refer to “Sensor operation table (Diagnostic code No.d:62)”.

TIP

Turning the main switch to “OFF” will not erase the malfunction history.

The engine operation is not normal but the engine trouble warning light does not come on.

1. Check the operation of following sensors and actuators in the Diagnostic mode. Refer to “Sensor operation table” and “Actuator operation table”.

d:01: Throttle position sensor (throttle angle)
d:30: Cylinders-#1/#4 ignition coil
d:31: Cylinders-#2/#3 ignition coil
d:36: Injector #1
d:37: Injector #2
d:38: Injector #3
d:39: Injector #4
d:48: Air induction system solenoid

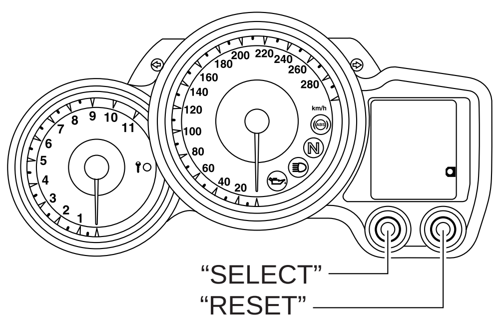
If a malfunction is detected in the sensors or actuators, repair or replace all faulty parts.
If no malfunction is detected in the sensors and actuators, check and repair inner parts of the engine.

EAS27410

DIAGNOSTIC MODE

Setting the diagnostic mode

1. Turn the main switch to “OFF”.
2. Disconnect the wire harness coupler from the fuel pump.
3. Simultaneously press and hold the “SELECT” and “RESET” buttons, turn the main switch to “ON”, and continue to press the buttons for 8 seconds or more.



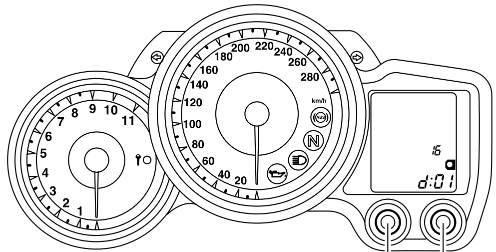
TIP

- All displays on the meter disappear except the odometer/tripmeter/fuel reserve tripmeter displays.
- “dIAG” appears on the odometer/tripmeter/fuel reserve tripmeter LCD.

4. Press the “SELECT” button to select the diagnostic mode “dIAG”.
5. After selecting “dIAG”, simultaneously press the “SELECT” and “RESET” buttons for 2 seconds or more to activate the diagnostic mode. The diagnostic code number “d:01” appears on the clock LCD.
6. Select the diagnostic code number corresponding to the fault code number by pressing the “SELECT” and “RESET” buttons.

TIP

- To decrease the selected diagnostic code number, press the “RESET” button. Press the “RESET” button for 1 second or longer to automatically decrease the diagnostic code numbers.
- To increase the selected diagnostic code number, press the “SELECT” button. Press the “SELECT” button for 1 second or longer to automatically increase the diagnostic code numbers.



7. Verify the operation of the sensor or actuator.
   - Sensor operation
     The data representing the operating conditions of the sensor appears on the trip LCD.
   - Actuator operation
     Set the engine stop switch to "◯" to operate the actuator.

TIP

If the engine stop switch is set to "◯", set it to "⊗", and then set it to "◯" again.

8. Turn the main switch to "OFF" to cancel the diagnostic mode.

Fault code table

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
11	No normal signals are received from the cylinder identification sensor.	• Open or short circuit in sub-wire harness. • Open or short circuit in wire harness. • Defective cylinder identification sensor. • Malfunction in ECU. • Improperly installed cylinder identification sensor.	—
12	No normal signals are received from the crankshaft position sensor.	• Open or short circuit in wire harness. • Defective crankshaft position sensor. • Malfunction in pickup rotor. • Malfunction in ECU. • Improperly installed crankshaft position sensor.	—
13	Intake air pressure sensor: open or short circuit detected.	• Open or short circuit in sub-wire harness. • Open or short circuit in wire harness. • Defective intake air pressure sensor. • Malfunction in ECU.	d:03
14	Intake air pressure sensor: hose system malfunction (clogged or detached hose).	• Intake air pressure sensor hose is detached, clogged, kinked, or pinched. • Malfunction in ECU.	d:03
15	Throttle position sensor: open or short circuit detected.	• Open or short circuit in sub-wire harness. • Open or short circuit in wire harness. • Defective throttle position sensor. • Malfunction in ECU. • Improperly installed throttle position sensor.	d:01
16	Stuck throttle position sensor is detected.	• Stuck throttle position sensor • Malfunction in ECU.	d:01

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
19	A break or disconnection of the black/red lead of the ECU is detected.	• Open or short circuit in wire harness. • Malfunction in ECU. • Defective relay unit (diode).	d:20
21	Coolant temperature sensor: open or short circuit detected.	• Open or short circuit in wire harness. • Defective coolant temperature sensor. • Malfunction in ECU. • Improperly installed coolant temperature sensor.	d:06
22	Intake air temperature sensor: open or short circuit detected.	• Open or short circuit in wire harness. • Defective intake temperature sensor. • Malfunction in ECU. • Improperly installed intake air temperature sensor.	d:05
24	No normal signal is received from the O_2 sensor.	• Open or short circuit in sub-wire harness. • Open or short circuit in wire harness. • Defective O_2 sensor. • Malfunction in ECU. • Improperly installed O_2 sensor.	—
30	Latch up detected. No normal signal is received from the lean angle sensor.	• The vehicle has overturned. • Defective lean angle sensor. • Malfunction in ECU. • Improperly installed lean angle sensor.	d:08
31	The amount of air-fuel ratio feedback compensation is maintained continuously in the vicinity of the upper limit (lean air-fuel ratio).	• Open or short circuit in sub-wire harness. • Open or short circuit in wire harness. • Fuel pressure too low. • Clogged injectors. • Defective O_2 sensor (unable to output a rich signal). • Malfunction in ECU. • Malfunction in other areas of the fuel system.	d:01
32	The amount of air-fuel ratio feedback compensation is maintained continuously in the vicinity of the lower limit (rich air-fuel ratio).	• Open or short circuit in sub-wire harness. • Open or short circuit in wire harness. • Fuel pressure too high. • Faulty injectors (excessive injection volume). • Defective O_2 sensor (unable to output a lean signal). • Malfunction in ECU. • Malfunction in other areas of the fuel system.	d:01
33	Malfunction detected in the primary wire of the cylinders-#1/#4 ignition coil.	• Open or short circuit in front cowling wire harness. • Open or short circuit in wire harness. • Malfunction in cylinders-#1/#4 ignition coil. • Malfunction in ECU.	d:30

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
34	Malfunction detected in the primary wire of the cylinders-#2/#3 ignition coil.	• Open or short circuit in front cowling wire harness. • Open or short circuit in wire harness. • Malfunction in cylinders-#2/#3 ignition coil. • Malfunction in ECU.	d:31
41	Lean angle sensor: open or short circuit detected.	• Open or short circuit in wire harness. • Defective lean angle sensor. • Malfunction in ECU.	d:08
42	No normal signals are received from the rear wheel sensor. Open or short circuit is detected in the neutral circuit of the gear position switch. (FJR13A) Open or short circuit is detected in the neutral switch. (FJR13AE)	• Open or short circuit in wire harness. • Defective rear wheel sensor. • Malfunction in rear wheel sensor detected. • Defective gear position switch. (FJR13A) • Defective neutral switch. (FJR13AE) • Malfunction in the engine side of the gear position switch. (FJR13A) • Malfunction in the engine side of the neutral switch. (FJR13AE) • Malfunction in ECU. • Malfunction in hydraulic unit assembly.	d:07 d:21
43	The ECU is unable to monitor the battery voltage (an open or short circuit in the line to the ECU).	• Open or short circuit in front cowling wire harness. • Open or short circuit in wire harness. • Malfunction in ECU.	d:09
44	An error is detected while reading or writing on EEPROM (CO adjustment value).	• Malfunction in ECU. (The CO adjustment value is not properly written on or read from the internal memory).	d:60
46	Power supply to the fuel injection system is not normal.	Malfunction in the charging system. Refer to “CHARGING SYSTEM” on page 8-29.	—
50	Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)	• Malfunction in ECU. (The program and data are not properly written on or read from the internal memory.)	—
Er-1	No signals are received from the ECU.	• Open or short circuit in front cowling wire harness. • Open or short circuit in wire harness. • Malfunction in meter assembly. • Malfunction in ECU. • Defective wire connection of the ECU coupler.	—
Er-2	No signals are received from the ECU within the specified duration.	• Open or short circuit in front cowling wire harness. • Open or short circuit in wire harness. • Malfunction in meter assembly. • Malfunction in ECU.	—

Fault code No.	Symptom	Probable cause of malfunction	Diagnostic code No.
Er-3	Data from the ECU cannot be received correctly.	• Open or short circuit in front cowling wire harness. • Open or short circuit in wire harness. • Malfunction in meter assembly. • Malfunction in ECU.	—
Er-4	Non-registered data has been received from the meter.	• Open or short circuit in front cowling wire harness. • Open or short circuit in wire harness. • Malfunction in meter assembly. • Malfunction in ECU.	—

Sensor operation table

Diag-nostic code No.	Item	Meter display	Checking method
d:01	Throttle angle • Fully closed position • Fully opened position	 15–17 97–100	 Check with throttle fully closed. Check with throttle fully open.
d:03	Pressure difference (atmospheric pressure and intake air pressure)	Displays the intake air pressure.	Set the engine stop switch to "◯", and then push the start switch "⊛". (If the display value changes, the performance is OK.)
d:05	Intake air temperature	Displays the intake air temperature.	Compare the actually measured intake air temperature with the meter display value. (*1)
d:06	Coolant temperature	Displays the coolant temperature.	Compare the actually measured coolant temperature with the meter display value.
d:07	Vehicle speed pulse	0–999	Check that the number increases when the rear wheel is rotated. The number is cumulative and does not reset each time the wheel is stopped.
d:08	Lean angle sensor • Upright • Overturned	 0.4–1.4 3.7–4.4	Remove the lean angle sensor and incline it more than 65 degrees.

Diag-nostic code No.	Item	Meter display	Checking method
d:09	Fuel system voltage (battery voltage)	Approximately 12.0	Set the engine stop switch to "◯", and then compare with the actually measured battery voltage. (If the battery voltage is lower, perform recharging.)
d:20	Sidestand switch • Stand retracted • Stand extended	 ON OFF	Set on/off the sidestand switch. (with the transmission in gear.)
d:21	Gear position switch (FJR13A) Neutral switch (FJR13AE) • Neutral • In gear	 ON OFF	Shift the transmission.
d:60	EEPROM fault code display • No history • History exists	 00 01–04 (Cylinder fault code) • (If more than one cylinder is defective, the display alternates every two seconds to show all the detected cylinder numbers. When all cylinder numbers are shown, the display repeats the same process.)	—
d:61	Malfunction history code display • No history • History exists	 00 Fault codes 11–70 • (If more than one code number is detected, the display alternates every two seconds to show all the detected code numbers. When all code numbers are shown, the display repeats the same process.)	—

Diag-nostic code No.	Item	Meter display	Checking method
d:62	Malfunction history code erasure • No history • History exists	 0 • Displays the total number of malfunctions, including the current malfunction, that have occurred since the history was last erased. (For example, if there have been three malfunctions, “03” is displayed.)	 — To erase the history, set the engine stop switch from “⊠” to “◯”.
d:70	Control number	0–255	—

*1 If it is not possible to check the intake temperature, use the ambient temperature as reference (use the compared values for reference).

Actuator operation table

Diag-nostic code No.	Item	Actuation	Checking method
d:30	Cylinders-#1/#4 ignition coil	Actuates the cylinders-#1/#4 ignition coil five times at one-second intervals. Illuminates the engine trouble warning light.	Check the spark five times. • Connect an ignition checker.
d:31	Cylinders-#2/#3 ignition coil	Actuates the cylinders-#2/#3 ignition coil five times at one-second intervals. Illuminates the engine trouble warning light.	Check the spark five times. • Connect an ignition checker.
d:36	Injector #1	Actuates the injector #1 five times at one-second intervals. Illuminates the engine trouble warning light.	Check the operating sound of the injector #1 five times.
d:37	Injector #2	Actuates the injector #2 five times at one-second intervals. Illuminates the engine trouble warning light.	Check the operating sound of the injector #2 five times.
d:38	Injector #3	Actuates the injector #3 five times at one-second intervals. Illuminates the engine trouble warning light.	Check the operating sound of the injector #3 five times.

Diag-nostic code No.	Item	Actuation	Checking method
d:39	Injector #4	Actuates the injector #4 five times at one-second intervals. Illuminates the engine trouble warning light.	Check the operating sound of the injector #4 five times.
d:48	Air induction system solenoid	Actuates the air induction system solenoid five times at one-second intervals. Illuminates the engine trouble warning light.	Check the operating sound of the air induction system solenoid five times.
d:50	Fuel pump relay	Actuates the fuel pump relay five times at one-second intervals. Illuminates the engine trouble warning light. (The engine trouble warning light is OFF when the relay is ON, and the engine trouble warning light is ON when the relay is OFF).	Check the operating sound of the fuel pump relay five times.
d:51	Radiator fan motor relay	Actuates the radiator fan motor relay for five cycles of five seconds. (ON 2 seconds, OFF 3 seconds) Illuminates the engine trouble warning light and rotates the radiator fan motors.	Check the operating sound of the radiator fan motor relay five times.
d:52	Headlight (on/off)/grip warmer relay	Actuates the headlight (on/off)/grip warmer relay for five cycles of five seconds. (ON 2 seconds, OFF 3 seconds) Illuminates the engine trouble warning light and headlight.	Check the operating sound of the headlight (on/off)/grip warmer relay five times.
d:57	Grip warmer	Illuminates the engine trouble warning light.	Disconnect the grip warmer control unit coupler from the control unit, if equipped, and then connect a pocket tester to the terminals (light green/white–black) of the coupler (wire harness side) and check for continuity.

EAS27450

TROUBLESHOOTING DETAILS

This section describes the measures per fault code number displayed on the meter. Check and service the items or components that are the probable cause of the malfunction following the order given.

After the check and service of the malfunctioning part has been completed, reset the meter display according to the reinstatement method.
Fault code No.:
Code number displayed on the meter when the engine failed to work normally. Refer to “Self-Diagnostic Function table”.
Diagnostic code No.:
Diagnostic code number to be used when the diagnostic mode is operated. Refer to “DIAGNOSTIC MODE” on page 8-69.

Fault code No.	**11**	**Symptom**	**No normal signals are received from the cylinder identification sensor.**
Diagnostic code No.		**—**	**—**

Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Installed condition of cylinder identification sensor.	Check for looseness or pinching.	Starting the engine and operating it at idle.
2	Connections • Cylinder identification sensor coupler • Wire harness ECU coupler • Sub-wire harness coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	
3	Open or short circuit in wire harness and/or sub-wire harness.	• Repair or replace if there is an open or short circuit. • Between cylinder identification sensor coupler and ECU coupler. (blue–blue) (white/black–white/black) (black/blue–black/blue)	
4	Defective cylinder identification sensor.	• Replace if defective. Refer to “CHECKING THE CYLINDER IDENTIFICATION SENSOR” on page 8-241.	

Fault code No.	12	Symptom	No normal signals are received from the crankshaft position sensor.
Diagnostic code No.	—	—	

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Installed condition of crankshaft position sensor	Check for looseness or pinching.	Cranking the engine.
2	Connections • Crankshaft position sensor coupler • Wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	
3	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between the crankshaft position sensor coupler and ECU coupler. (gray–gray) (black/blue–black/blue)	
4	Defective crankshaft position sensor.	• Replace if defective. Refer to “CHECKING THE CRANKSHAFT POSITION SENSOR” on page 8-236.	

Fault code No.	13	Symptom	Intake air pressure sensor: open or short circuit detected.
Diagnostic code No.	d:03		Intake air pressure sensor

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections • Intake air pressure sensor coupler • Wire harness ECU coupler • Sub-wire harness coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning the main switch to "ON".
2	Open or short circuit in wire harness and/or sub-wire harness.	• Repair or replace if there is an open or short circuit. • Between intake air pressure sensor coupler and ECU coupler. (black/blue–black/blue) (pink/white–pink/white) (blue–blue)	
3	Defective intake air pressure sensor	• Execute the diagnostic mode. (Code No.d:03) • Replace if defective. Refer to "CHECKING THE INTAKE AIR PRESSURE SENSOR" on page 8-242.	

Fault code No.	14	Symptom	Intake air pressure sensor: hose system malfunction (clogged or detached hose).
Diagnostic code No.	d:03		Intake air pressure sensor

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Intake air pressure sensor hose	• Check the intake air pressure sensor hose condition. • Repair or replace the sensor hose.	Starting the engine and operating it at idle.
2	Intake air pressure sensor malfunction at intermediate electrical potential.	• Check and repair the connection. • Replace it if there is a malfunction.	
3	Connections • Intake air pressure sensor coupler • Wire harness ECU coupler • Sub-wire harness coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	

<table>
<tr><th>Fault code No.</th><th>15</th><th>Symptom</th><th colspan="2">Throttle position sensor: open or short circuit detected.</th></tr>
<tr><th colspan="2">Diagnostic code No.</th><th>d:01</th><th colspan="2">Throttle position sensor</th></tr>
<tr><th>Order</th><th>Item/components and probable cause</th><th colspan="2">Check or maintenance job</th><th>Reinstatement method</th></tr>
<tr><td>1</td><td>Installed condition of throttle position sensor.</td><td colspan="2">Check for looseness or pinching.</td><td rowspan="9">Turning the main switch to “ON”.</td></tr>
<tr><td>2</td><td>Connections
• Throttle position sensor coupler
• Wire harness ECU coupler
• Sub-wire harness coupler</td><td colspan="2">• Check the coupler for any pins that may be pulled out.
• Check the locking condition of the coupler.
• If there is a malfunction, repair it and connect the coupler securely.</td></tr>
<tr><td>3</td><td>Open or short circuit in wire harness and/or sub-wire harness.</td><td colspan="2">• Repair or replace if there is an open or short circuit.
• Between throttle position sensor coupler and ECU coupler.
(black/blue–black/blue)
(yellow–yellow)
(blue–blue)</td></tr>
<tr><td rowspan="5">4</td><td rowspan="5">Throttle position sensor lead wire open circuit output voltage check.</td><td colspan="2">• Check for open circuit and replace the throttle position sensor.
(black/blue–yellow)</td></tr>
<tr><td>Open circuit item</td><td>Output voltage</td></tr>
<tr><td>Ground wire open circuit</td><td>5 V</td></tr>
<tr><td>Output wire open circuit</td><td>0 V</td></tr>
<tr><td>Power supply wire open circuit</td><td>0 V</td></tr>
<tr><td>5</td><td>Defective throttle position sensor.</td><td colspan="2">• Execute the diagnostic mode. (Code No.d:01)
• Replace if defective.
Refer to “CHECKING THE THROTTLE POSITION SENSOR” on page 8-241.</td></tr>
</table>

<table>
<tr><th colspan="2">Fault code No.</th><th>16</th><th>Symptom</th><th colspan="3">Stuck throttle position sensor is detected.</th></tr>
<tr><th colspan="2">Diagnostic code No.</th><th colspan="2">d:01</th><th colspan="3">Throttle position sensor</th></tr>
<tr><th>Order</th><th colspan="3">Item/components and probable cause</th><th colspan="2">Check or maintenance job</th><th>Reinstatement method</th></tr>
<tr><td>1</td><td colspan="3">Installed condition of throttle position sensor.</td><td colspan="2">Check for looseness or pinching.</td><td rowspan="9">Starting the engine and operating it at idle, and then by racing it.</td></tr>
<tr><td>2</td><td colspan="3">Connections
• Throttle position sensor coupler
• Wire harness ECU coupler
• Sub-wire harness coupler</td><td colspan="2">• Check the coupler for any pins that may be pulled out.
• Check the locking condition of the coupler.
• If there is a malfunction, repair it and connect the coupler securely.</td></tr>
<tr><td rowspan="5">3</td><td colspan="3" rowspan="5">Throttle position sensor lead wire open circuit output voltage check.</td><td colspan="2">• Check for open circuit and replace the throttle position sensor.
(black/blue–yellow)</td></tr>
<tr><td>Open circuit item</td><td>Output voltage</td></tr>
<tr><td>Ground wire open circuit</td><td>5 V</td></tr>
<tr><td>Output wire open circuit</td><td>0 V</td></tr>
<tr><td>Power supply wire open circuit</td><td>0 V</td></tr>
<tr><td>4</td><td colspan="3">Defective throttle position sensor.</td><td colspan="2">• Execute the diagnostic mode. (Code No.d:01)
• Replace if defective.
Refer to “CHECKING THE THROTTLE POSITION SENSOR” on page 8-241.</td></tr>
</table>

Fault code No.	19	Symptom	A break or disconnection of the black/red lead of the ECU is detected.
Diagnostic code No.		d:20	Sidestand switch

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections • Wire harness ECU coupler • Relay unit coupler	• Execute the diagnostic mode. (Code No.d:20) • Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	If the transmission is in gear, retracting the sidestand. If the transmission is in neutral, reconnecting the wiring.
2	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between relay unit coupler and ECU coupler. (black/red–black/red) • Between relay unit coupler and sidestand switch coupler. (blue/green–blue/green)	
3	Defective sidestand switch	• Replace if defective. Refer to "CHECKING THE SWITCHES" on page 8-221.	
4	Defective relay unit (diode)	• Replace if defective. Refer to "CHECKING THE RELAYS" on page 8-231.	

Fault code No.	21	Symptom	Coolant temperature sensor: open or short circuit detected.
Diagnostic code No.	d:06	Coolant temperature sensor	

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Installed condition of coolant temperature sensor	Check for looseness or pinching.	Turning the main switch to “ON”.
2	Connections • Coolant temperature sensor coupler • Wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	
3	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between coolant temperature sensor coupler and ECU coupler. (black/blue–black/blue) (green/white–green/white)	
4	Defective coolant temperature sensor.	• Execute the diagnostic mode. (Code No.d:06) • Replace if defective. Refer to “CHECKING THE COOLANT TEMPERATURE SENSOR” on page 8-240.	

Fault code No.	22	Symptom	Intake air temperature sensor: open or short circuit detected.
Diagnostic code No.		d:05	Intake air temperature sensor

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Installed condition of intake air temperature sensor	Check for looseness or pinching.	Turning the main switch to "ON".
2	Connections • Intake air temperature sensor coupler • Wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	
3	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between intake air temperature sensor coupler and ECU coupler. (black/blue–black/blue) (brown/white–brown/white)	
4	Defective intake air temperature sensor.	• Execute the diagnostic mode. (Code No.d:05) • Replace if defective. Refer to "CHECKING THE INTAKE AIR TEMPERATURE SENSOR" on page 8-242.	

Fault code No.	24	Symptom	No normal signal is received from the O_2 sensor.
Diagnostic code No.	—	—	

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Installed condition of O_2 sensor	Check for looseness or pinching.	Starting the engine, warming it up until the coolant temperature is 60 °C or more, and then running it between 2000–3000 r/min until the engine trouble warning light turns off.
2	Connections • O_2 sensor coupler • Relay unit coupler • Wire harness ECU coupler • Sub-wire harness coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	
3	Open or short circuit in wire harness and/or sub-wire harness.	• Repair or replace if there is an open or short circuit. • Between O_2 sensor coupler and ECU coupler. (black/blue–black/blue) (gray/white–gray/white) • Between O_2 sensor coupler and relay unit coupler. (red/blue–red/blue) • Between O_2 sensor coupler and sub-wire harness coupler. (black–black)	
4	Check fuel pressure.	Refer to “CHECKING THE FUEL PRESSURE” on page 7-8.	
5	Defective O_2 sensor	Replace if defective.	

Fault code No.	30	Symptom	Latch up detected. No normal signal is received from the lean angle sensor.
Diagnostic code No.	d:08	Lean angle sensor	

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	The vehicle has overturned.	Raise the vehicle upright.	Turning the main switch to “ON” (however, the engine cannot be restarted unless the main switch is first turned “OFF”).
2	Installed condition of lean angle sensor	Check the installed direction and condition of the sensor.	
3	Connections • Lean angle sensor coupler • Wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	
4	Defective lean angle sensor	• Execute the diagnostic mode. (Code No.d:08) • Replace if defective. Refer to “CHECKING THE LEAN ANGLE SENSOR” on page 8-236.	

<table>
<tr><td>Fault code No.</td><td>31</td><td>Symptom</td><td colspan="2">The amount of air-fuel ratio feedback compensation is maintained continuously in the vicinity of the upper limit (lean air-fuel ratio).</td></tr>
<tr><td colspan="2">Diagnostic code No.</td><td>d:01</td><td colspan="2">Throttle position sensor</td></tr>
<tr><td>Order</td><td colspan="2">Item/components and probable cause</td><td>Check or maintenance job</td><td>Reinstatement method</td></tr>
<tr><td>1</td><td colspan="2">Connections
• O_2 sensor coupler
• Relay unit coupler
• Wire harness ECU coupler
• Sub-wire harness coupler</td><td>• Check the coupler for any pins that may be pulled out.
• Check the locking condition of the coupler.
• If there is a malfunction, repair it and connect the coupler securely.</td><td rowspan="4">Starting the engine, warming it up until the coolant temperature is 60 °C (140 °F) or more, and then running it between 2000–3000 r/min until the engine trouble warning light turns off.</td></tr>
<tr><td>2</td><td colspan="2">Open or short circuit in wire harness and/or sub-wire harness.</td><td>• Repair or replace if there is an open or short circuit.
• Between O_2 sensor coupler and ECU coupler.
(black/blue–black/blue)
(gray/white–gray/white)
• Between O_2 sensor coupler and relay unit coupler.
(red/blue–red/blue)
• Between O_2 sensor coupler and sub-wire harness coupler.
(black–black)</td></tr>
<tr><td>3</td><td colspan="2">Defective O_2 sensor</td><td>Replace if defective. (Unable to output a rich signal)</td></tr>
<tr><td>4</td><td colspan="2">Clogged injector</td><td>• Replace if defective.
Refer to “CHECKING THE INJECTORS” on page 7-8.</td></tr>
</table>

Fault code No.	31	Symptom	The amount of air-fuel ratio feedback compensation is maintained continuously in the vicinity of the upper limit (lean air-fuel ratio).
Diagnostic code No.	d:01	Throttle position sensor	

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
5	The fuel pressure is too low.	• Compare the fuel pressures at idle and with throttle open. • About the same → Normal • Too low → Refer to the following table.	
		• Check the fuel pump. • Replace if defective. Refer to “CHECKING THE FUEL PUMP BODY” on page 7-3.	
		• Check the delivery hose for pinching or kinking. • Repair or replace if there is a malfunction.	
		• Check the pressure regulator. • Replace if defective. Refer to “CHECKING THE FUEL PRESSURE” on page 7-8.	
		• Check the throttle position sensor. • Execute the diagnostic mode. (Code No.d:01) • Replace if defective.	
		• Check the fuel system (disconnection, etc.). • Repair or replace if there is a malfunction.	
		• Check the intake system (improper sealing, etc.). • Repair or replace if there is a malfunction.	

Fault code No.	**32**	**Symptom**	**The amount of air-fuel ratio feedback compensation is maintained continuously in the vicinity of the lower limit (rich air-fuel ratio).**
Diagnostic code No.	**d:01**	**Throttle position sensor**	

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections • O_2 sensor coupler • Relay unit coupler • Wire harness ECU coupler • Sub-wire harness coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Starting the engine, warming it up until the coolant temperature is 60 °C (140 °F) or more, and then running it between 2000–3000 r/min until the engine trouble warning light turns off.
2	Open or short circuit in wire harness and/or sub-wire harness.	• Repair or replace if there is an open or short circuit. • Between O_2 sensor coupler and ECU coupler. (black/blue–black/blue) (gray/white–gray/white) • Between O_2 sensor coupler and relay unit coupler. (red/blue–red/blue) • Between O_2 sensor coupler and sub-wire harness coupler. (black–black)	
3	Defective O_2 sensor	Replace if defective. (Unable to output a rich signal)	
4	Excessive volume of fuel injected by injector.	• Check the injector. • Check the fuel pressure. Refer to “CHECKING THE FUEL PRESSURE” on page 7-8.	
5	The fuel pressure is too high.	• Compare the fuel pressures at idle and with throttle open. About the same → Normal Too high → Refer to the following table.	
		• Check the pressure regulator. • Replace if defective. Refer to “CHECKING THE FUEL PRESSURE” on page 7-8.	
		• Check the throttle position sensor. • Execute the diagnostic mode. (Code No.d:01) • Replace if defective.	
		• Check the fuel system (clogging, etc.). • Repair or replace if there is a malfunction.	

Fault code No.	33	Symptom	Malfunction detected in the primary wire of the cylinders-#1/#4 ignition coil.
Diagnostic code No.		d:30	Cylinders-#1/#4 ignition coil

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections • Cylinders-#1/#4 ignition coil connector (primary coil side) • Wire harness ECU coupler • Front cowling wire harness coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Starting the engine and operating it at idle.
2	Open or short circuit in wire harness and/or front cowling wire harness.	• Repair or replace if there is an open or short circuit. • Between cylinders-#1/#4 ignition coil connector and ECU coupler. (orange–orange) • Between cylinders-#1/#4 ignition coil connector and right handlebar switch coupler. (red/black–red/black)	
3	Defective cylinders-#1/#4 ignition coil	• Execute the diagnostic mode. (Code No.d:30) • Test the primary and secondary coils for continuity. • Replace if defective. Refer to "CHECKING THE IGNITION COILS" on page 8-235.	

Fault code No.	**34**	**Symptom**	**Malfunction detected in the primary wire of the cylinders-#2/#3 ignition coil.**
Diagnostic code No.	**d:31**	**Cylinders-#2/#3 ignition coil**	
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Connections • Cylinders-#2/#3 ignition coil connector (primary coil side) • Wire harness ECU coupler • Front cowling wire harness coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Starting the engine and operating it at idle.
2	Open or short circuit in wire harness and/or front cowling wire harness.	• Repair or replace if there is an open or short circuit. • Between cylinders-#2/#3 ignition coil connector and ECU coupler. (gray/red–gray/red) • Between cylinders-#2/#3 ignition coil connector and right handlebar switch coupler. (red/blue–red/black)	
3	Defective cylinders-#2/#3 ignition coil	• Execute the diagnostic mode. (Code No.d:31) • Test the primary and secondary coils for continuity. • Replace if defective. Refer to "CHECKING THE IGNITION COILS" on page 8-235.	

Fault code No.	41	Symptom	Lean angle sensor: open or short circuit detected.
Diagnostic code No.		d:08	Lean angle sensor

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections • Lean angle sensor coupler • Wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning the main switch to "ON".
2	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between lean angle sensor coupler and ECU coupler. (black/blue–black/blue) (yellow/green–yellow/green) (blue–blue)	
3	Defective lean angle sensor	• Execute the diagnostic mode. (Code No.d:08) • Replace if defective. Refer to "CHECKING THE LEAN ANGLE SENSOR" on page 8-236.	

Fault code No.	42	Symptom	A. No normal signals are received from the rear wheel sensor. B. Open or short circuit is detected in the neutral circuit of the gear position switch. (FJR13A) Open or short circuit is detected in the neutral switch. (FJR13AE)
Diagnostic code No.	A	d:07	Rear wheel sensor
	B	d:21	Gear position switch (neutral circuit) (FJR13A) Neutral switch (FJR13AE)

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
A-1	Connections • Rear wheel sensor coupler • Wire harness ECU coupler • ABS ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Starting the engine, and inputting the vehicle speed signals by operating the vehicle at a 20 to 30 km/h.
A-2	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between rear wheel sensor coupler and ABS ECU coupler. (white–white) (gray–gray) • Between ABS ECU coupler and ECU coupler. (white/yellow–white/yellow)	
A-3	Sensor rotor for detecting vehicle speed has broken.	• Replace the rear wheel. Refer to “REAR WHEEL” on page 4-25.	
A-4	Defective rear wheel sensor	• Execute the diagnostic mode. (Code No.d:07) • Replace if defective. Refer to “MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR” on page 4-28.	

Fault code No.	42	Symptom	A. No normal signals are received from the rear wheel sensor. B. Open or short circuit is detected in the neutral circuit of the gear position switch. (FJR13A) Open or short circuit is detected in the neutral switch. (FJR13AE)
Diagnostic code No.	A	d:07	Rear wheel sensor
	B	d:21	Gear position switch (neutral circuit) (FJR13A) Neutral switch (FJR13AE)

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
B-1	Connections • Gear position switch coupler (FJR13A) • Neutral switch coupler (FJR13AE) • Wire harness ECU coupler • Relay unit coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Starting the engine, and inputting the vehicle speed signals by operating the vehicle at a 20 to 30 km/h.
B-2	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between gear position switch coupler and relay unit coupler. (sky blue–sky blue) (FJR13A) • Between neutral switch coupler and relay unit coupler. (sky blue–sky blue) (FJR13AE) • Between relay unit coupler and ECU coupler. (black/red–black/red) • Between neutral switch coupler and ECU coupler. (sky blue–sky blue) (FJR13AE)	
B-3	Faulty shift drum (neutral detection area)	• Replace if defective. Refer to “TRANSMISSION” on page 5-124.	
B-4	Defective gear position switch (neutral circuit) (FJR13A) Defective neutral switch (FJR13AE)	• Execute the diagnostic mode. (Code No.d:21) • Replace if defective. Refer to “CHECKING THE SWITCHES” on page 8-221.	

Fault code No.	43	Symptom	The ECU is unable to monitor the battery voltage (an open or short circuit in the line to the ECU).
Diagnostic code No.	d:09	Fuel system voltage	

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections • Relay unit coupler • Wire harness ECU coupler • Front cowling wire harness coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Starting the engine and operating it at idle.
2	Open or short circuit in the wire harness and/or front cowling wire harness.	• Repair or replace if there is an open or short circuit. • Between relay unit coupler and ECU coupler. (blue/yellow–blue/yellow) (red/blue–red/blue) • Between relay unit coupler and engine stop switch coupler. (red/black–red/black)	
3	Malfunction or open circuit in fuel pump relay.	• Execute the diagnostic mode. (Code No.d:09) • Replace if defective. • If there is no malfunction with the fuel pump relay, replace the ECU.	

Fault code No.	44	Symptom	An error is detected while reading or writing on EEPROM (CO adjustment value).
Diagnostic code No.	d:60	EEPROM fault cylinder No.	

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Malfunction in ECU.	• Set the faulty cylinder's exhaust gas volume. 1. Execute the diagnostic mode (Code No.d:60) to check the faulty cylinder number. (If multiple cylinders are defective, the numbers of the faulty cylinders are displayed alternately at 2-second intervals.) • Replace ECU if it does not recover from the malfunction.	Turning the main switch to "ON". (Readjust the exhaust gas volume after it is reinstated.)

Fault code No.	46	Symptom	Power supply to the fuel injection system is not normal.
Diagnostic code No.	—	—	

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections • Wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Starting the engine and operating it at idle.
2	Faulty battery.	• Replace or charge the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-228.	
3	Malfunction in rectifier/regulator	• Replace if defective. Refer to “CHARGING SYSTEM” on page 8-29.	
4	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between battery and main switch coupler. (red–red) • Between main switch coupler and ignition fuse. (brown/blue–brown/blue) • Between ignition fuse and ECU coupler. (red/white–red/white)	

Fault code No.	50	Symptom	Faulty ECU memory. (When this malfunction is detected in the ECU, the fault code number might not appear on the meter.)
Diagnostic code No.	—	—	

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Malfunction in ECU.	Replace the ECU. **TIP** Do not perform this procedure with the main switch turned to “ON”.	Turning the main switch to “ON”.

Fault code No.	Er-1	Symptom	No signals are received from the ECU.
Diagnostic code No.	—	—	

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections • Meter assembly coupler • Wire harness ECU coupler • Front cowling wire harness coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning the main switch to "ON".
2	Open or short circuit in wire harness and/or front cowling wire harness	• Repair or replace if there is an open or short circuit. • Between meter assembly coupler and ECU coupler. (yellow/blue–yellow/blue)	
3	Malfunction in meter assembly	Replace the meter assembly.	
4	Malfunction in ECU	Replace the ECU.	

Fault code No.	Er-2	Symptom	No signals are received from the ECU within the specified duration.
Diagnostic code No.	—	—	

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections • Meter assembly coupler • Wire harness ECU coupler • Front cowling wire harness coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning the main switch to "ON".
2	Open or short circuit in wire harness and/or front cowling wire harness	• Repair or replace if there is an open or short circuit. • Between meter assembly coupler and ECU coupler. (yellow/blue–yellow/blue)	
3	Malfunction in meter assembly	Replace the meter assembly.	
4	Malfunction in ECU	Replace the ECU.	

Fault code No.	Er-3	Symptom	Data from the ECU cannot be received correctly.
Diagnostic code No.	—	—	

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections • Meter assembly coupler • Wire harness ECU coupler • Front cowling wire harness coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning the main switch to “ON”.
2	Open or short circuit in wire harness and/or front cowling wire harness	• Repair or replace if there is an open or short circuit. • Between meter assembly coupler and ECU coupler. (yellow/blue–yellow/blue)	
3	Malfunction in meter assembly	Replace the meter assembly.	
4	Malfunction in ECU	Replace the ECU.	

Fault code No.	Er-4	Symptom	Non-registered data has been received from the meter.
Diagnostic code No.	—	—	

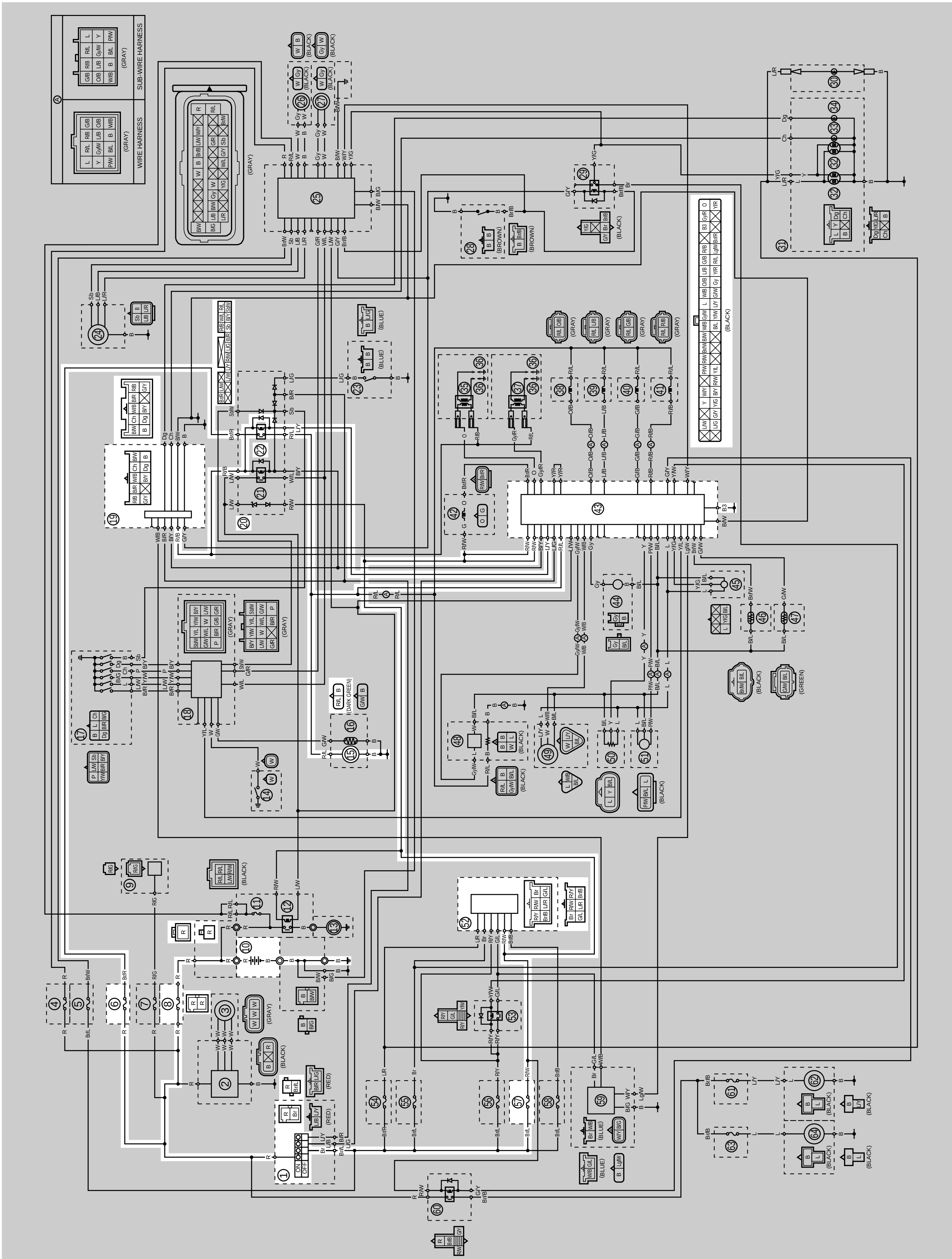
Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections • Meter assembly coupler • Wire harness ECU coupler • Front cowling wire harness coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning the main switch to “ON”.
2	Open or short circuit in wire harness and/or front cowling wire harness	• Repair or replace if there is an open or short circuit. • Between meter assembly coupler and ECU coupler. (yellow/blue–yellow/blue)	
3	Malfunction in meter assembly	Replace the meter assembly.	
4	Malfunction in ECU	Replace the ECU.	

EAS27550

FUEL PUMP SYSTEM

EAS27560

CIRCUIT DIAGRAM (1/2)

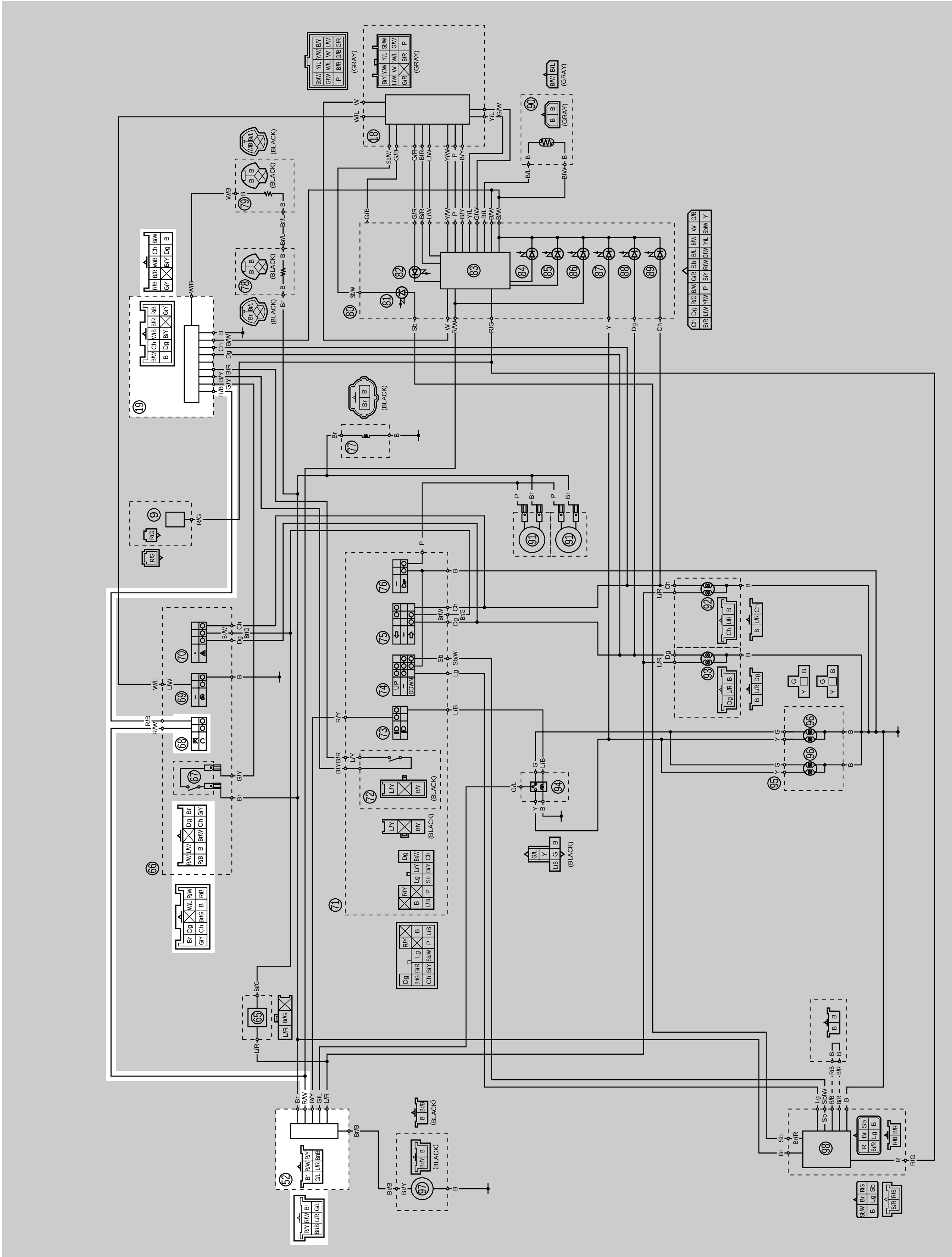


1. Main switch
6. Fuel injection system fuse
8. Main fuse
10. Battery
15. Fuel pump
19. Coupler 3 (wire harness–front cowling wire harness)
20. Relay unit
22. Fuel pump relay
43. ECU (engine control unit)
52. Coupler 4 (wire harness–front cowling wire harness)
57. Ignition fuse

ET3P61007

CIRCUIT DIAGRAM (2/2)

Front cowling wire harness



19. Coupler 3 (wire harness–front cowling wire harness)
52. Coupler 4 (wire harness–front cowling wire harness)
68. Engine stop switch

EAS27570

TROUBLESHOOTING

If the fuel pump fails to operate.

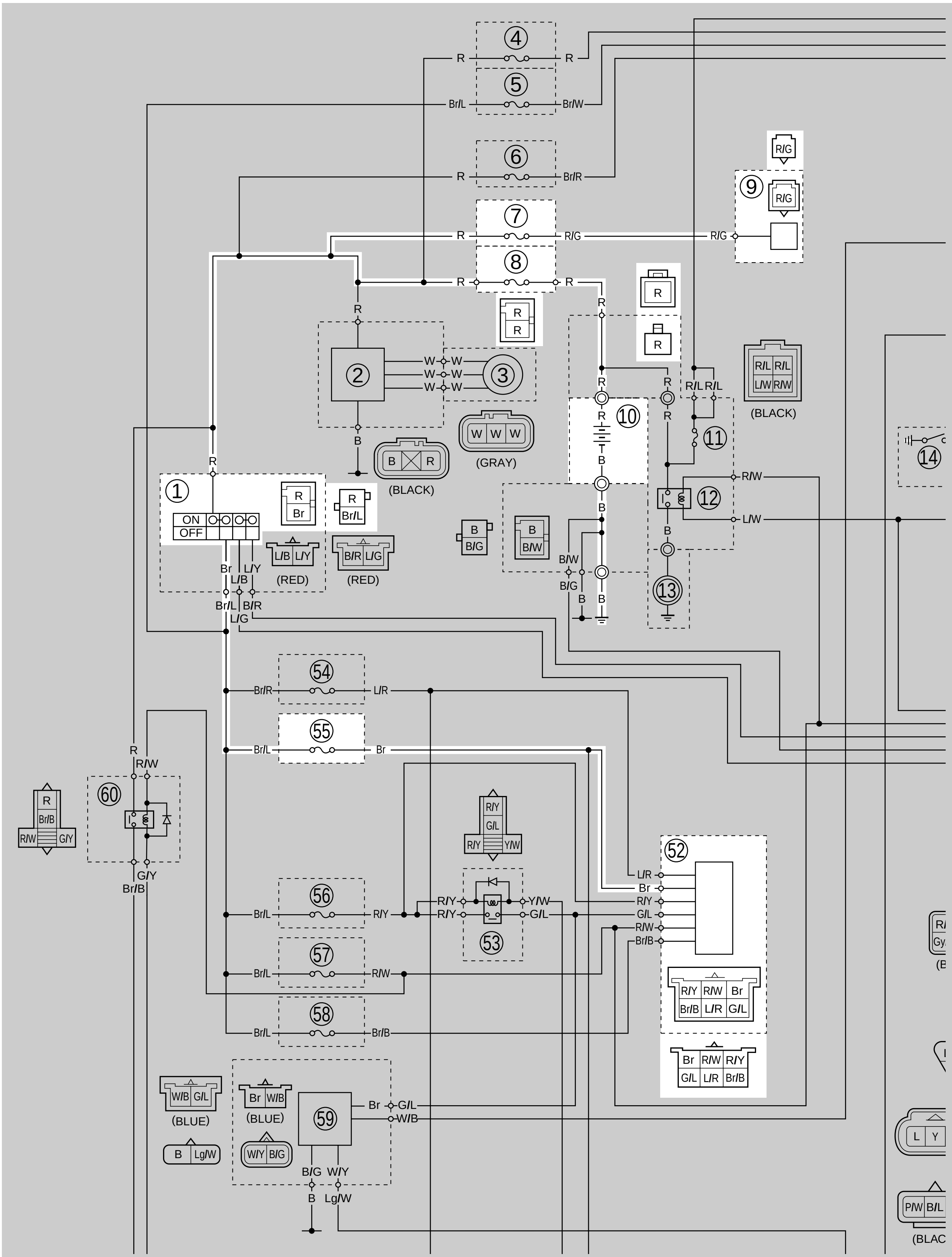
TIP

- Before troubleshooting, remove the following part(s):
1. Front cowling assembly
2. Fuel tank
3. T-bar
4. Storage compartment

Check		Action
1. Check the fuses. (Main, ignition, and fuel injection system) Refer to “CHECKING THE FUSES” on page 8-227.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-228.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the main switch.
OK ↓		
4. Check the engine stop switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the right handlebar switch.
OK ↓		
5. Check the relay unit (fuel pump relay). Refer to “CHECKING THE RELAYS” on page 8-231.	NG →	Replace the relay unit.
OK ↓		
6. Check the fuel pump. Refer to “CHECKING THE FUEL PUMP BODY” on page 7-3.	NG →	Replace the fuel pump assembly.
OK ↓		
7. Check the entire fuel pump system wiring. Refer to “CIRCUIT DIAGRAM (1/2)” on page 8-99 and “CIRCUIT DIAGRAM (2/2)” on page 8-101.	NG →	Properly connect or repair the fuel pump system wiring.
OK ↓		
Replace the ECU.		

EAS27610
WINDSHIELD DRIVE SYSTEM

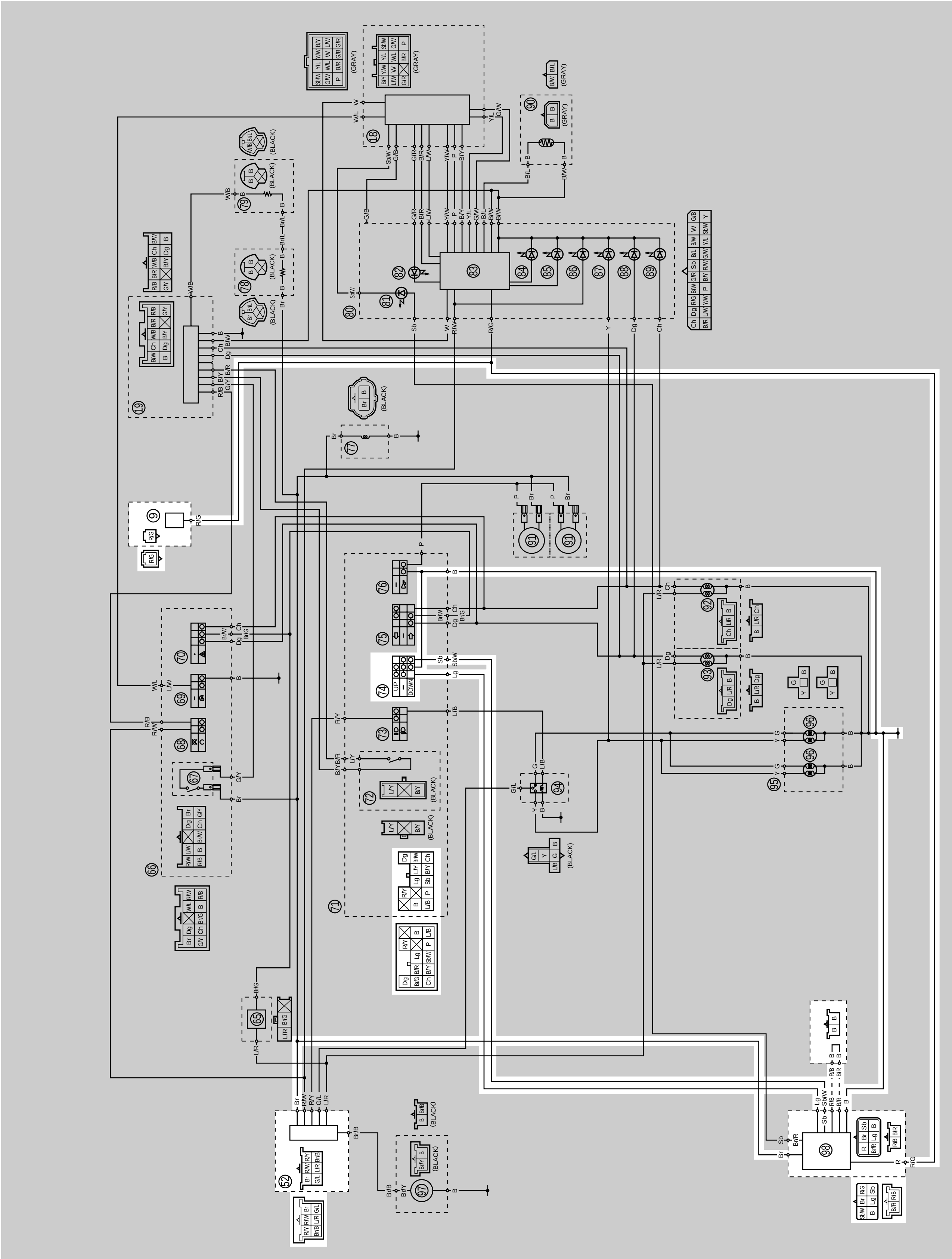
EAS27620
CIRCUIT DIAGRAM (1/2)



1. Main switch
7. Backup fuse (odometer, clock, and windshield drive system)
8. Main fuse
9. Coupler 1 (wire harness–front cowling wire harness)
10. Battery
52. Coupler 4 (wire harness–front cowling wire harness)
55. Signaling system fuse

ET3P61008
CIRCUIT DIAGRAM (2/2)

Front cowling wire harness



9. Coupler 1 (wire harness–front cowling wire harness)
52. Coupler 4 (wire harness–front cowling wire harness)
74. Windshield position switch
98. Windshield drive unit

EAS27630

TROUBLESHOOTING

The windshield fails to move.

TIP

- Before troubleshooting, remove the following part(s):

1. Front cowling assembly
2. Fuel tank
3. T-bar

1. Check that there are no rocks or other foreign material in the windshield drive unit side rails.	NG →	Remove the foreign material.
OK ↓		
2. Check that there is no foreign material between the cable and the pulley.	NG →	Remove the foreign material.
OK ↓		
3. Check the fuses. (Main, signaling system, and backup) Refer to “CHECKING THE FUSES” on page 8-227.	NG →	Replace the fuse(s).
OK ↓		
4. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-228.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
5. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the main switch.
OK ↓		
6. Check the windshield position switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the left handlebar switch.
OK ↓		

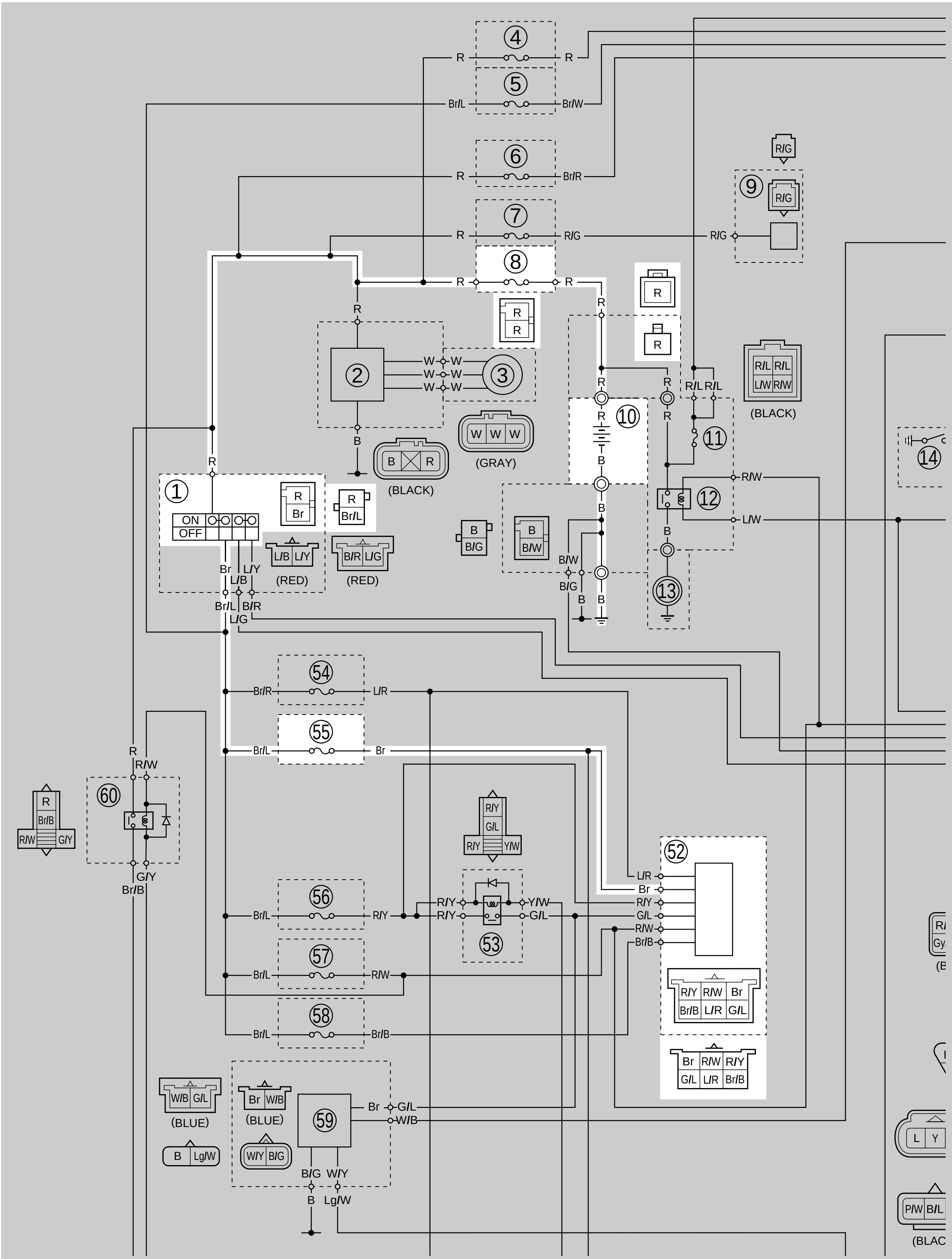
7. Check the entire windshield drive system wiring. Refer to “CIRCUIT DIAGRAM (1/2)” on page 8-105 and “CIRCUIT DIAGRAM (2/2)” on page 8-107.	NG →	Properly connect or repair the windshield drive system wiring.

OK ↓

Replace the windshield drive unit.

ET3P61009
ACCESSORY BOX SYSTEM

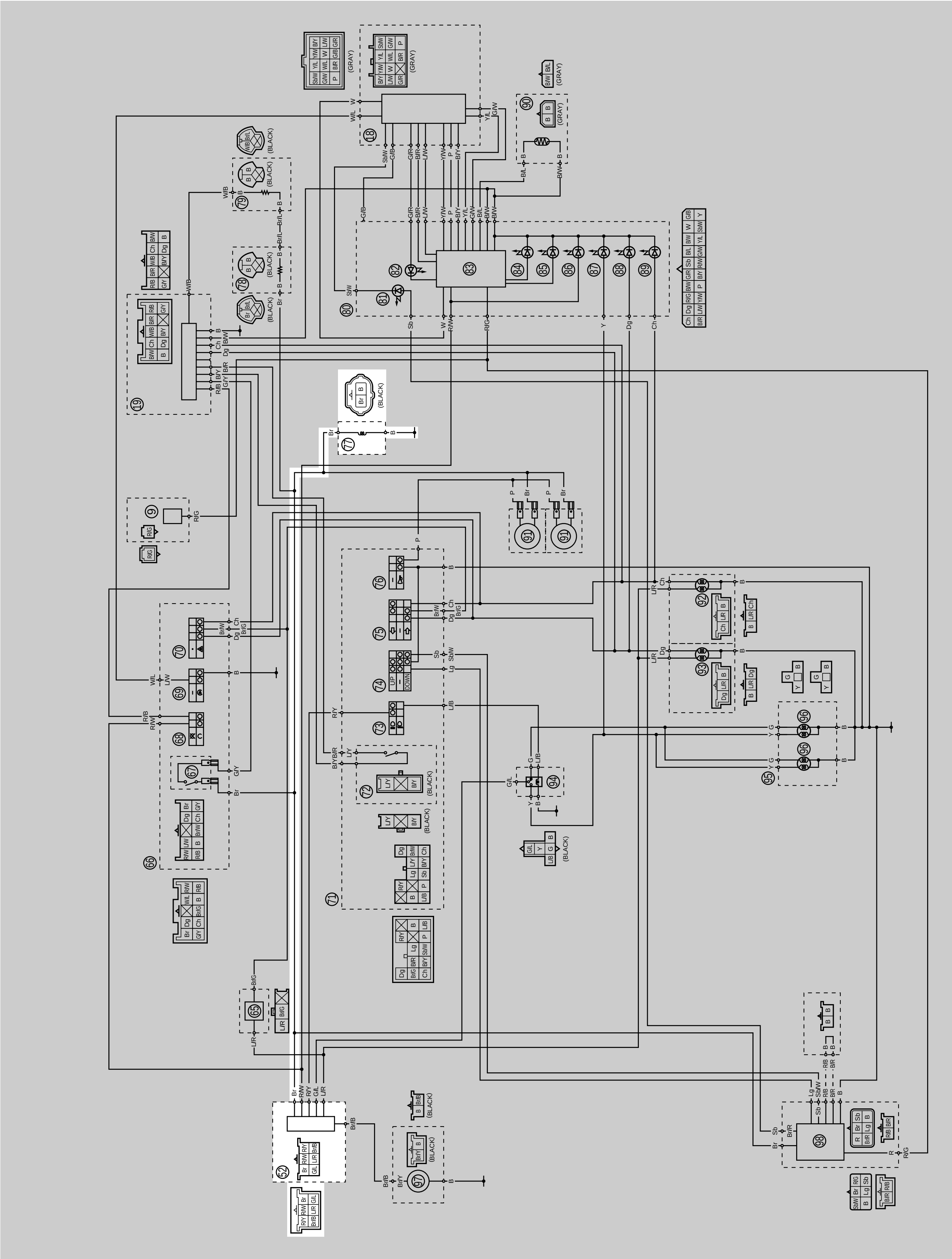
ET3P61010
CIRCUIT DIAGRAM (1/2)



1. Main switch
8. Main fuse
10. Battery
52. Coupler 4 (wire harness–front cowling wire harness)
55. Signaling system fuse

ET3P61011
CIRCUIT DIAGRAM (2/2)

Front cowling wire harness



52. Coupler 4 (wire harness–front cowling wire harness)
77. Accessory box solenoid

ET3P61012
TROUBLESHOOTING
The accessory box fails to operate.

TIP

• Before troubleshooting, remove the following part(s):
1. Front cowling assembly

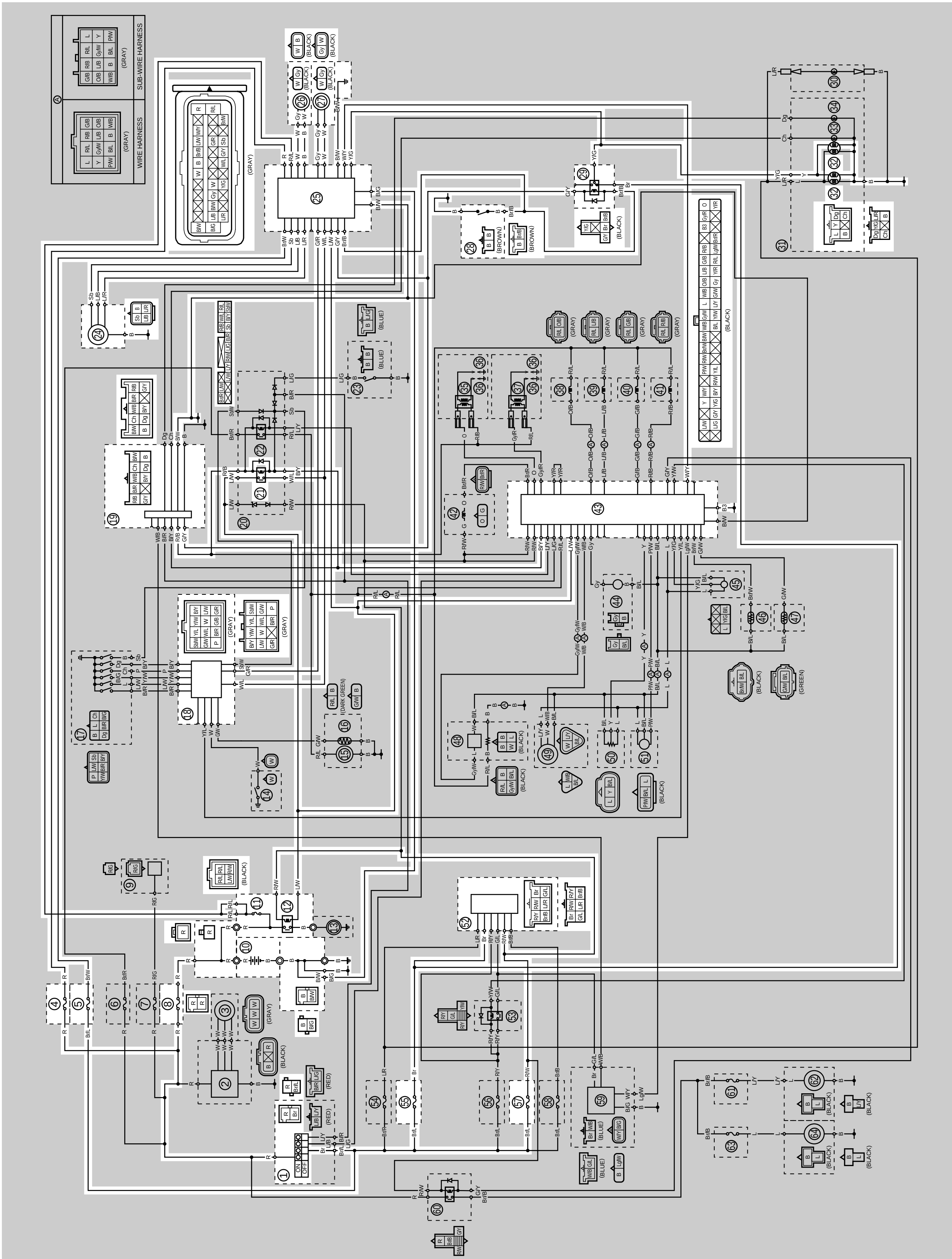
Check		Action
1. Check the fuses. (Main and signaling system) Refer to “CHECKING THE FUSES” on page 8-227.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-228.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the main switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	NG →	Replace the main switch.
OK ↓		
4. Check the accessory box solenoid. Refer to “CHECKING THE ACCESSORY BOX SOLENOID” on page 8-243.	NG →	Replace the accessory box solenoid.
OK ↓		
5. Check the entire accessory box system wiring. Refer to “CIRCUIT DIAGRAM (1/2)” on page 8-105 and “CIRCUIT DIAGRAM (2/2)” on page 8-107.	NG →	Properly connect or repair the accessory box system wiring.
OK ↓		
This accessory box system circuit is OK.		

EAS28790

ABS (ANTI-LOCK BRAKE SYSTEM)

EAS27730

CIRCUIT DIAGRAM (1/2) (FJR13A)

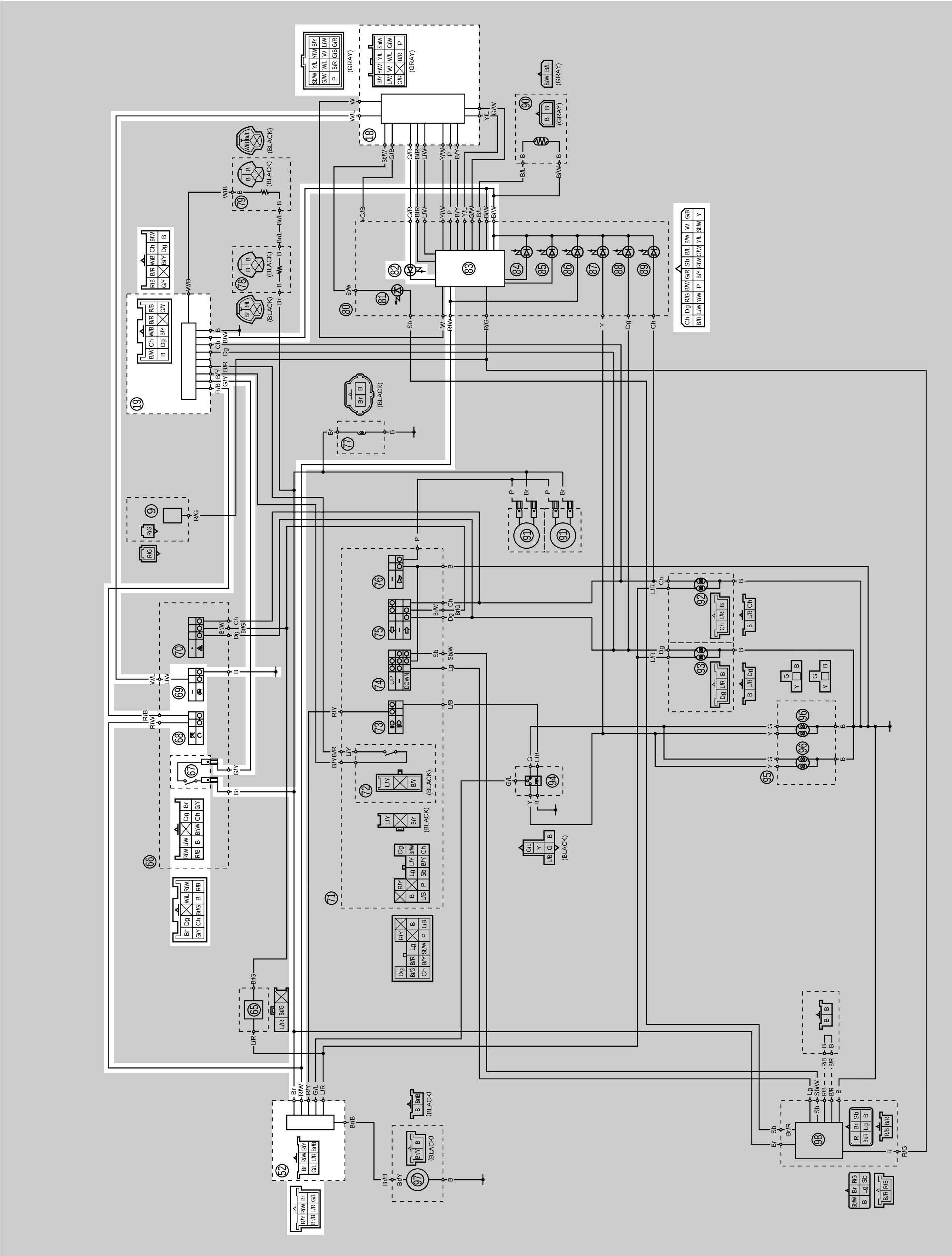


1. Main switch
4. ABS solenoid fuse
5. ABS ECU fuse
8. Main fuse
10. Battery
11. ABS motor fuse
12. Starter relay
18. Coupler 2 (wire harness–front cowling wire harness)
19. Coupler 3 (wire harness–front cowling wire harness)
21. Starting circuit cut-off relay
24. ABS test coupler
25. ABS ECU (electronic control unit)
26. Front wheel sensor
27. Rear wheel sensor
28. Rear brake light switch
29. Brake light relay
32. Tail/brake light
43. ECU (engine control unit)
52. Coupler 4 (wire harness–front cowling wire harness)
55. Signaling system fuse
57. Ignition fuse

ET3P61021

CIRCUIT DIAGRAM (2/2) (FJR13A)

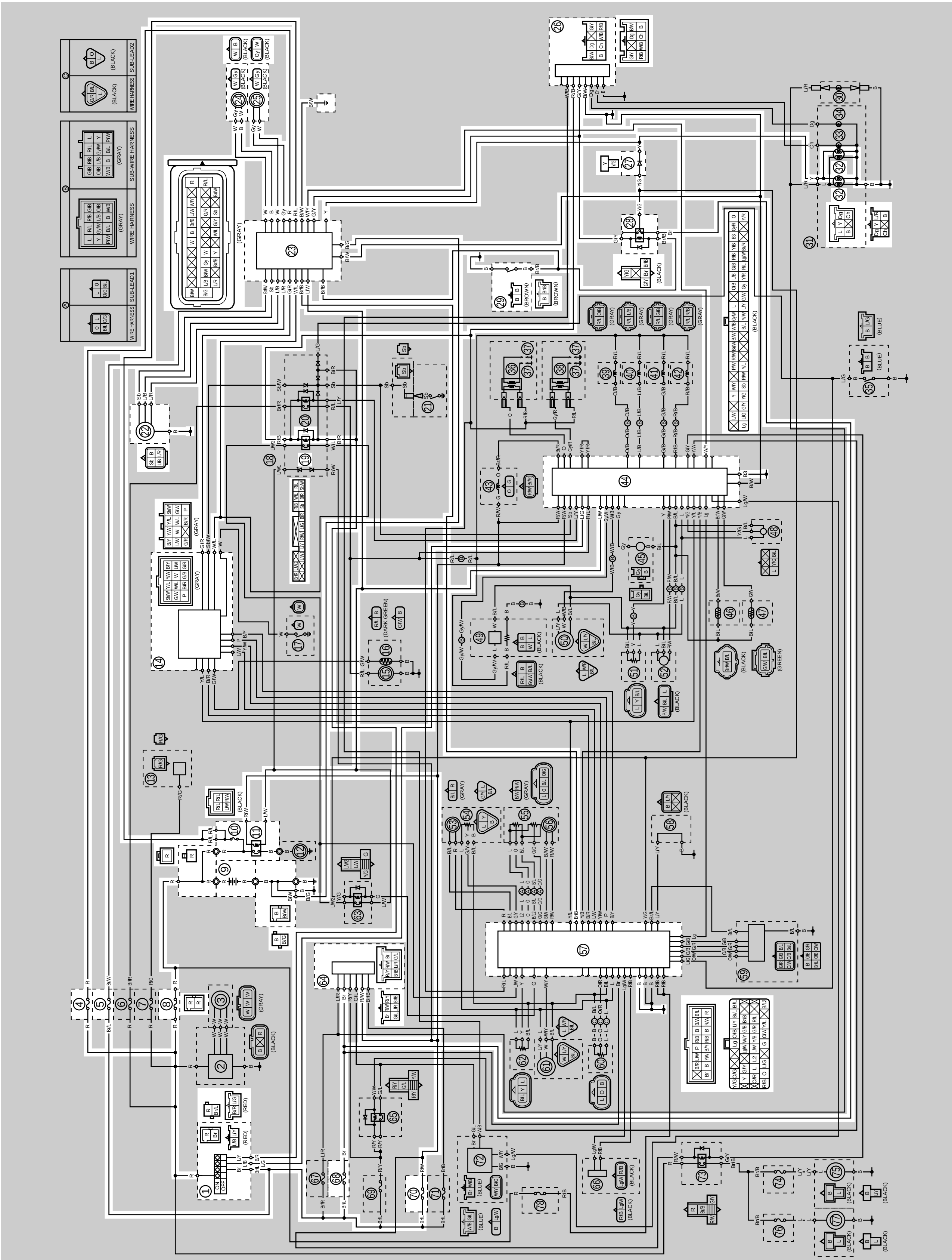
Front cowling wire harness



18. Coupler 2 (wire harness–front cowling wire harness)
19. Coupler 3 (wire harness–front cowling wire harness)
52. Coupler 4 (wire harness–front cowling wire harness)
67. Front brake light switch
68. Engine stop switch
69. Start switch
82. ABS warning light
83. Multi-function meter

ET3P66014

CIRCUIT DIAGRAM (1/2) (FJR13AE)

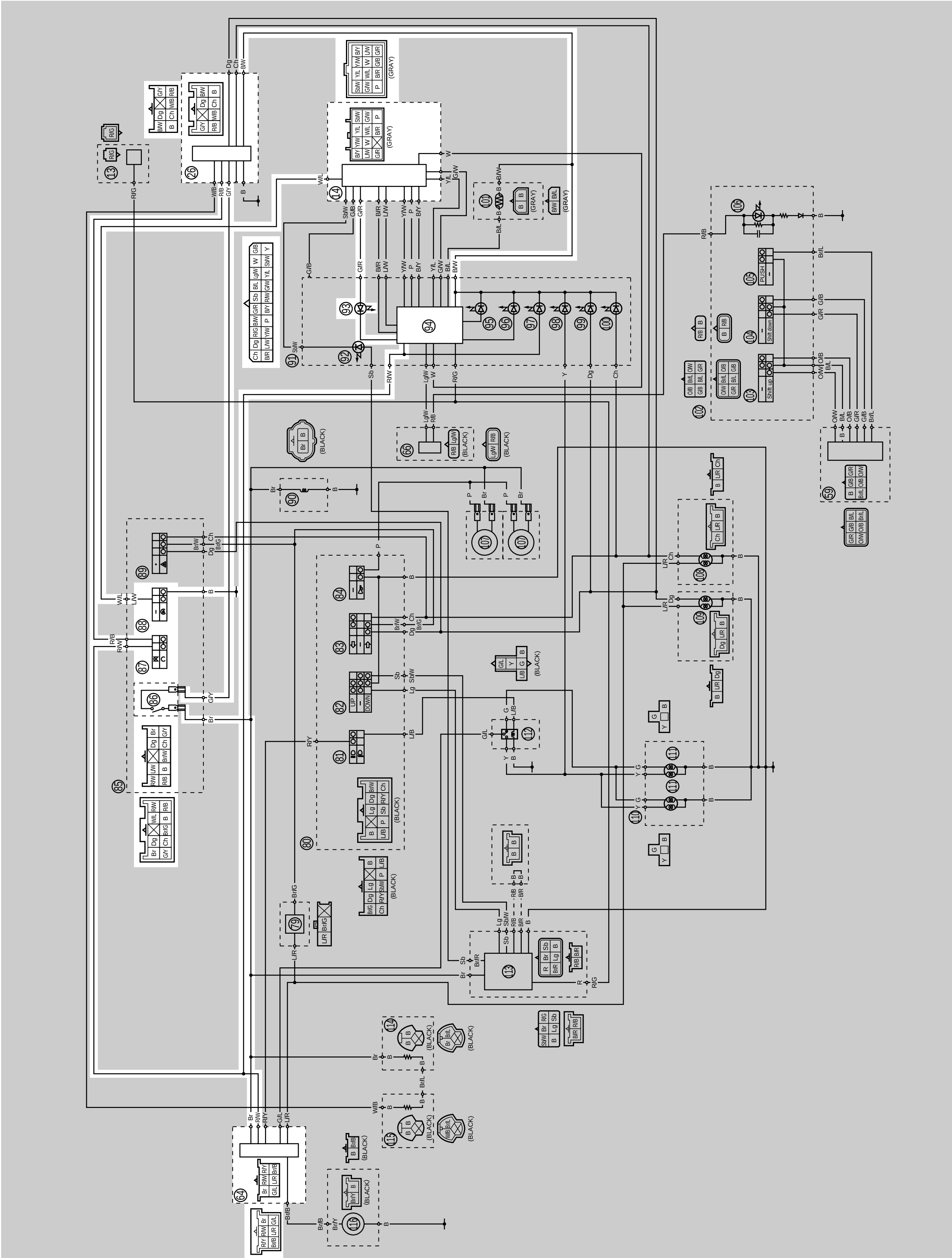


1. Main switch
4. ABS solenoid fuse
5. ABS ECU fuse
8. Main fuse
9. Battery
10. ABS motor fuse
11. Starter relay
14. Coupler 2 (wire harness–front cowling wire harness)
19. Starting circuit cut-off relay
22. ABS test coupler
23. ABS ECU (electronic control unit)
24. Front wheel sensor
25. Rear wheel sensor
26. Coupler 3 (wire harness–front cowling wire harness)
27. Diode
28. Brake light relay
29. Rear brake light switch
32. Tail/brake light
44. ECU (engine control unit)
57. MCU (motor control unit)
64. Coupler 5 (wire harness–front cowling wire harness)
68. Signaling system fuse
70. Ignition fuse

ET3P66015

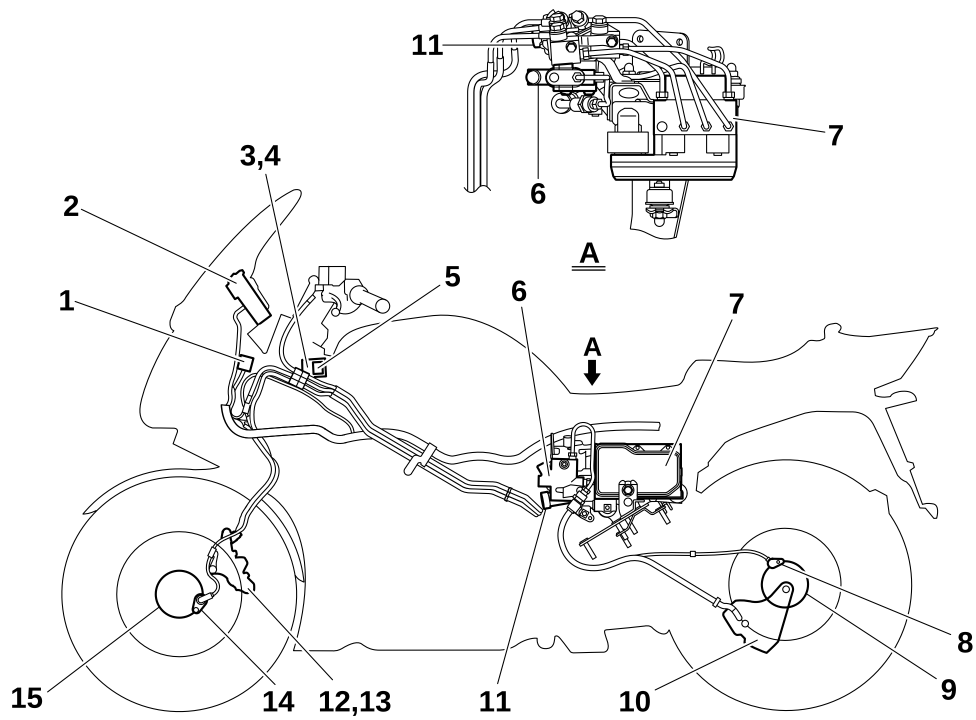
CIRCUIT DIAGRAM (2/2) (FJR13AE)

Front cowling wire harness



14. Coupler 2 (wire harness–front cowling wire harness)
26. Coupler 3 (wire harness–front cowling wire harness)
64. Coupler 5 (wire harness–front cowling wire harness)
86. Front brake light switch
87. Engine stop switch
88. Start switch
93. ABS warning light
94. Multi-function meter

EAS27740
ABS COMPONENTS CHART

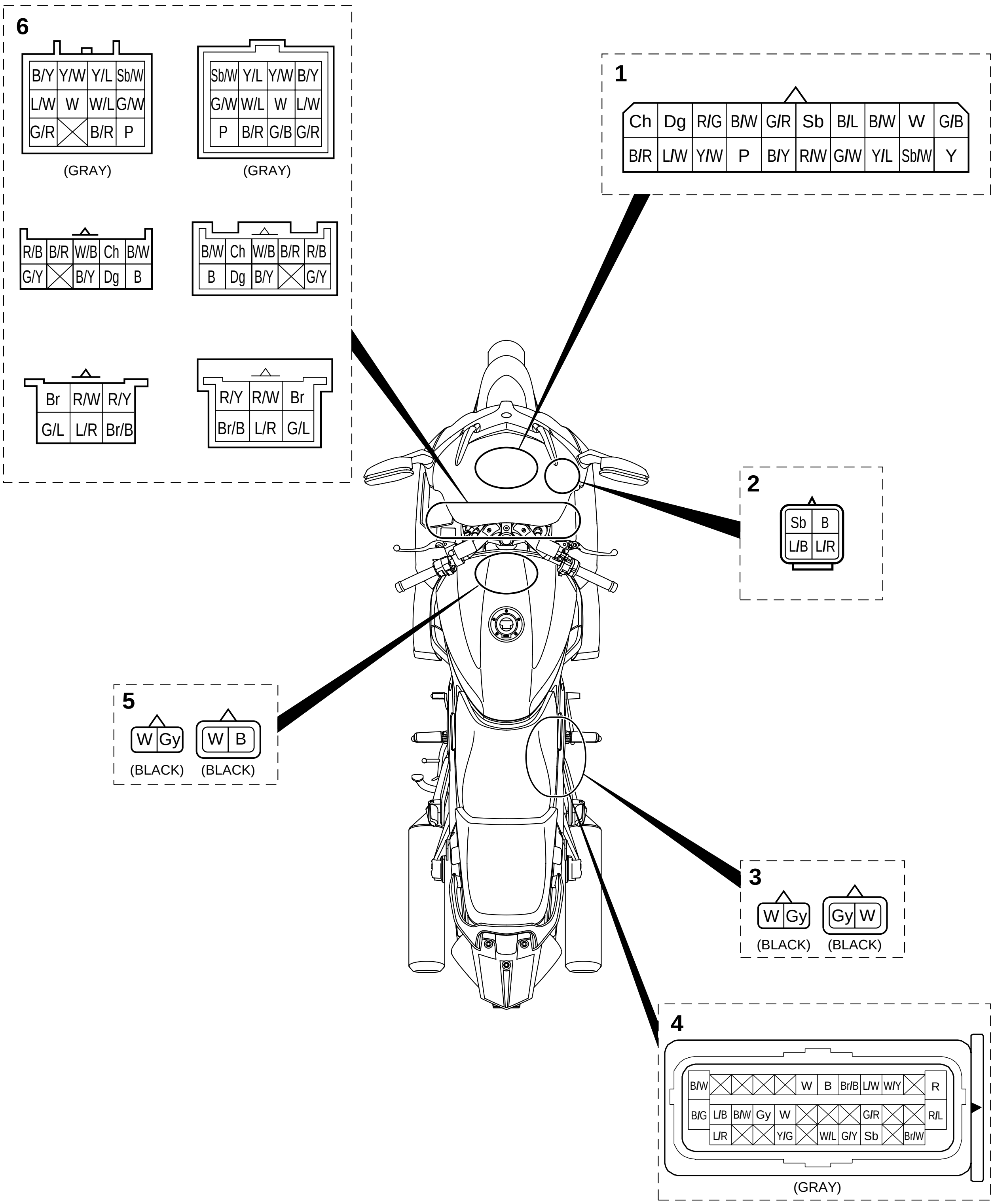


1. ABS test coupler
2. ABS warning light
3. ABS ECU fuse
4. ABS solenoid fuse
5. ABS motor fuse
6. Proportioning valve
7. Hydraulic unit assembly
8. Rear wheel sensor
9. Rear wheel sensor rotor
10. Rear brake caliper
11. Metering valve
12. Left front brake caliper
13. Right front brake caliper (partially operated together with the rear brake)
14. Front wheel sensor
15. Front wheel sensor rotor

EAS27750

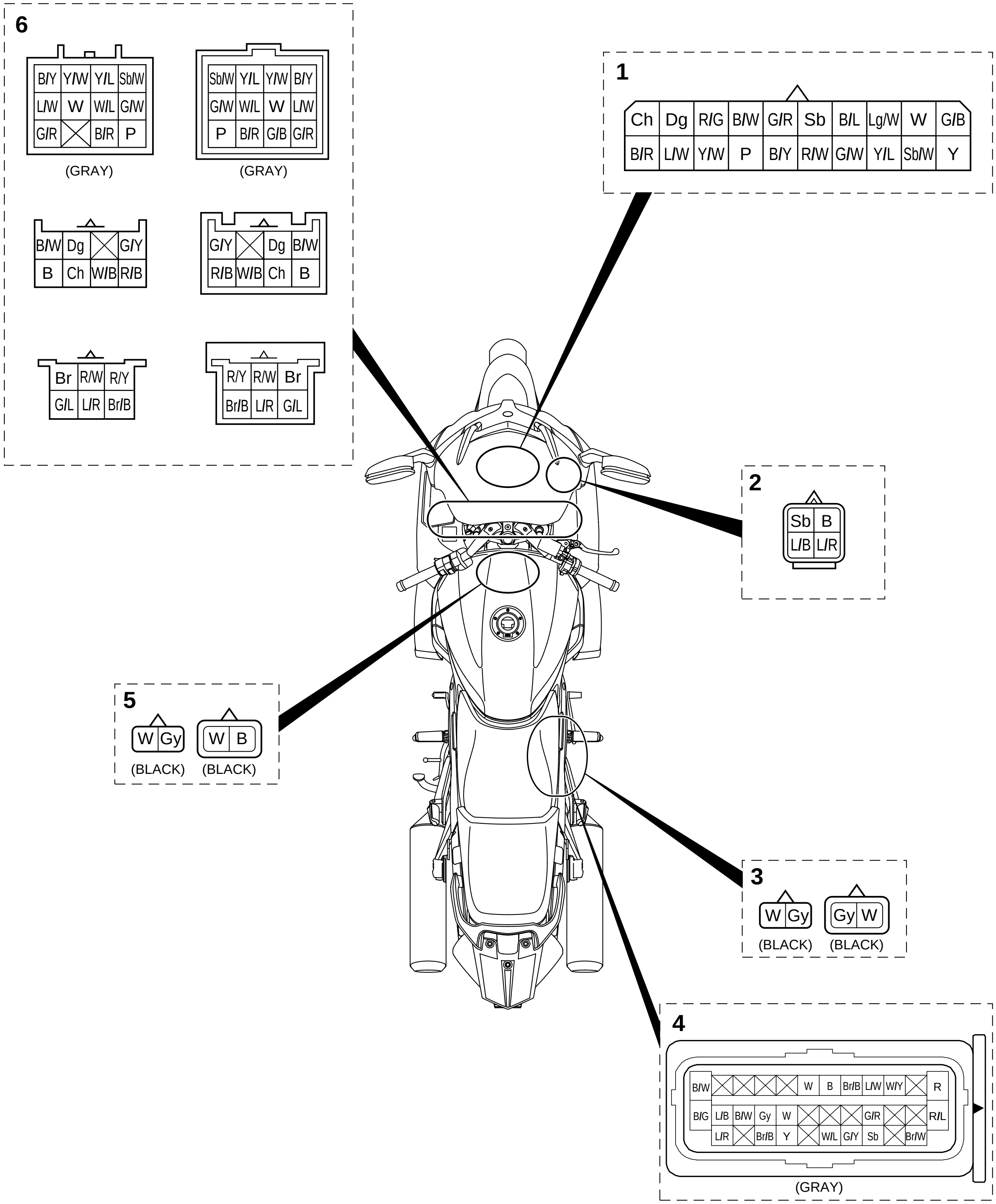
ABS COUPLER LOCATION CHART

FJR13A



1. Meter assembly coupler
2. ABS test coupler
3. Rear wheel sensor coupler
4. ABS ECU coupler
5. Front wheel sensor coupler
6. Wire harness–front cowling wire harness coupler

FJR13AE


6
B/Y Y/W Y/L Sb/W
L/W W W/L G/W
G/R B/R P
(GRAY)
Sb/W Y/L Y/W B/Y
G/W W/L W L/W
P B/R G/B G/R
(GRAY)
B/W Dg G/Y
B Ch W/B R/B
G/Y Dg B/W
R/B W/B Ch B
Br R/W R/Y
G/L L/R Br/B
R/Y R/W Br
Br/B L/R G/L
1
Ch Dg R/G B/W G/R Sb B/L Lg/W W G/B
B/R L/W Y/W P B/Y R/W G/W Y/L Sb/W Y
2
Sb B
L/B L/R
5
W Gy
(BLACK)
W B
(BLACK)
3
W Gy
(BLACK)
Gy W
(BLACK)
4
B/W W B Br/B L/W W/Y R
B/G L/B B/W Gy W G/R R/L
L/R Br/B Y W/L G/Y Sb Br/W
(GRAY)

1. Meter assembly coupler
2. ABS test coupler
3. Rear wheel sensor coupler
4. ABS ECU coupler
5. Front wheel sensor coupler
6. Wire harness–front cowling wire harness coupler

EAS27770

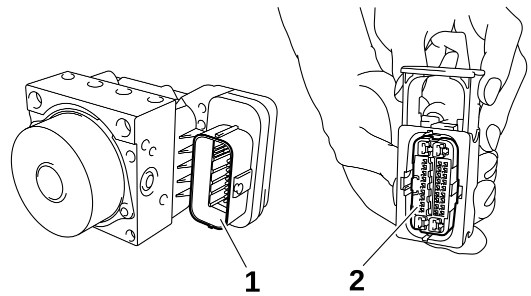
MAINTENANCE OF THE ABS ECU

Checking the ABS ECU

1. Check:
   - Terminals “1” of the ABS ECU
     Cracks/damages → Replace the hydraulic unit assembly and the brake pipes that are connected to the assembly as a set.
   - Terminals “2” of the ABS ECU coupler
     Connection defective, contaminated, come-off → Correct or clean.

TIP

If the ABS ECU coupler is clogged with mud or dirt, clean with compressed air.



EAS27790

ABS TROUBLESHOOTING OUTLINE

This section describes the troubleshooting for the ABS in detail. Read this service manual carefully and make sure you fully understand the information provided before repairing any malfunctions or performing service.
The ABS ECU (electronic control unit) has a self-diagnosis function. When failures occur in the system, the ABS warning light on the meter assembly indicates a malfunction.
The following troubleshooting describes the problem identification and service method according to the indications by the multi-function display. For troubleshooting items other than the following items, follow the normal service method.

EW3P61011

WARNING

When maintenance or checks have been performed on components related to the ABS, be sure to perform a final check before delivering the vehicle to the customer. (Refer to “[D-3] FINAL CHECK” on page 8-168.)

ABS operation when the ABS warning light comes on

1. The ABS warning light remains on → ABS operates as a normal brake system.
   - A malfunction was detected using the ABS self-diagnosis function.
2. The ABS warning light comes on, and then goes off when starting the engine → ABS operation is normal.
   - The ABS warning light comes on for 2 seconds, and then goes off every time the main switch is turned to “ON”.
   - The ABS warning light comes on while the start switch is being pushed.
3. The ABS warning light flashes → ABS operation is normal.
   - Refer to “BASIC INSTRUCTIONS FOR TROUBLESHOOTING” on page 8-132.

Self-diagnosis and servicing

The ABS ECU has a self-diagnosis function. By utilizing this function, quick problem identification and service are possible. Previous malfunctions can be checked since the ABS ECU also stores the malfunction history.
The multi-function display indicates all the fault codes recorded in the ABS ECU.
Note all of the indicated fault codes if more than two fault codes are stored in the memory. When the service is finished, check the normal operation of the vehicle, and then delete the fault code(s). (Refer to “[D-3] FINAL CHECK” on page 8-168.) By deleting the fault codes stored in the ABS ECU memory, it is possible to pursue the cause correctly if another malfunction occurs.

TIP

The ABS performs a self-diagnosis test for a few seconds each time the vehicle first starts off after the main switch was turned on. During this test, a “clicking” noise can be heard from under the seat, and if the brake lever or brake pedal are even slightly applied, a vibration can be felt at the lever and pedal, but these do not indicate a malfunction.

Self-diagnosis using the ABS ECU
The ABS ECU performs a static check of the entire system when the main switch is turned to “ON”. It also checks for malfunctions while the vehicle is ridden. Since all malfunctions are recorded after they are detected, it is possible to check the recorded malfunction data by utilizing the multi-function display when the ABS ECU has entered the self-diagnosis mode.

Special precautions for handling and servicing a vehicle equipped with ABS

EC3P61030

NOTICE

Care should be taken not to damage components by subjecting them to shocks or pulling on them with too much force since the ABS components are precisely adjusted.

- The ABS ECU and hydraulic unit are united assemblies and cannot be disassembled.
- The malfunction history is stored in the memory of the ABS ECU. Delete the fault codes when the service is finished. (This is because the past fault codes will be displayed again if another malfunction occurs.)

EAS27800

BASIC INSTRUCTIONS FOR TROUBLESHOOTING

EW3P61004

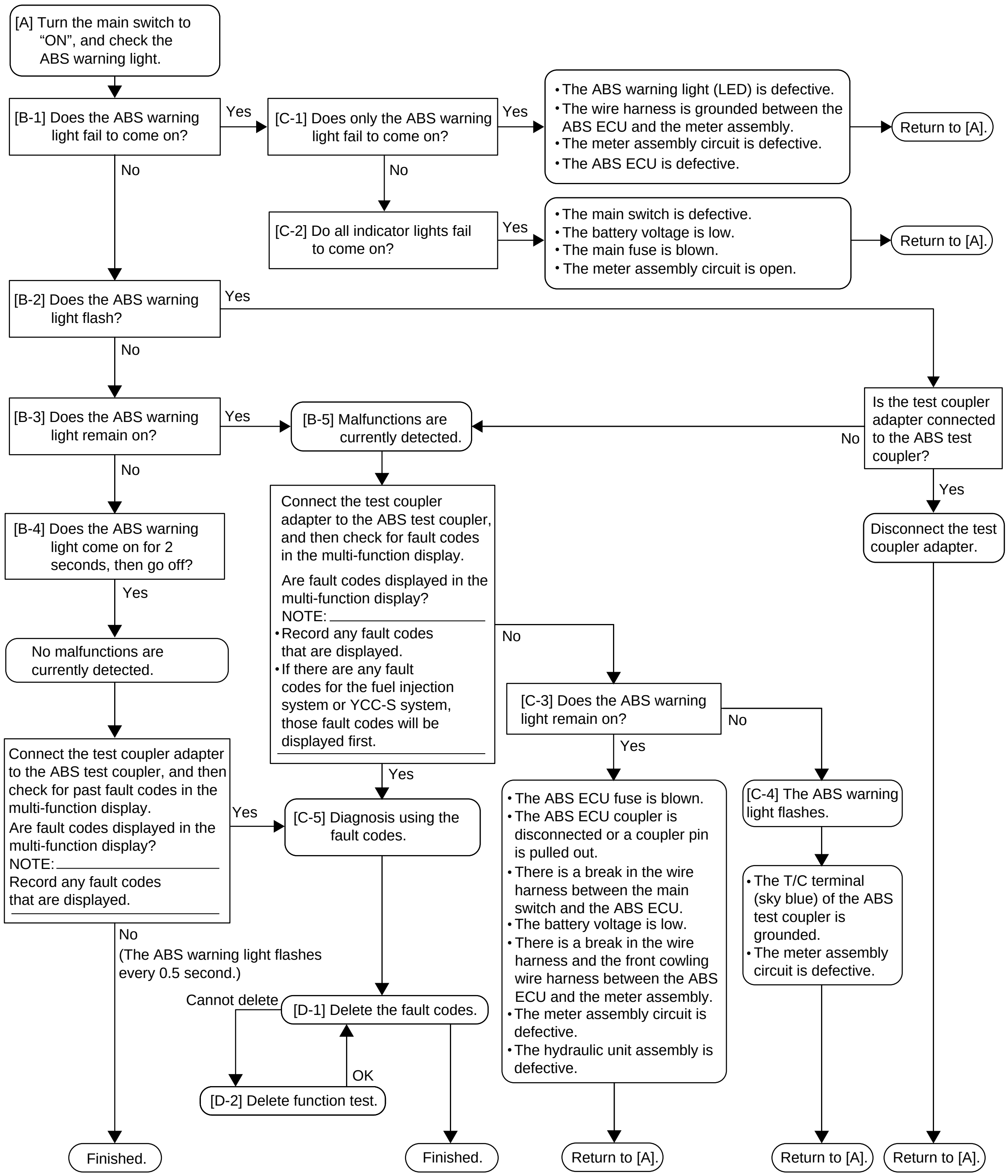
⚠ WARNING

- **Perform the troubleshooting [A] → [B] → [C] → [D] in order. Be sure to follow the order since a wrong diagnosis could result if the steps are followed in a different order or omitted.**
- **Use sufficiently charged regular batteries only.**

[A] Malfunction check using the ABS warning light
[B] Detailed check of the malfunction
The results of the self-diagnosis by the ABS ECU can be displayed using the multi-function display.
[C] Determining the cause and location of the malfunction
Determine the cause of the malfunction from the condition and place where the malfunction occurred.
[D] Servicing the ABS
Execute the final check after disassembly and assembly.

EAS27810

BASIC PROCESS FOR TROUBLESHOOTING



EW3P61011

WARNING

When maintenance or checks have been performed on components related to the ABS, be sure to perform a final check before delivering the vehicle to the customer. (Refer to "[D-3] FINAL CHECK" on page 8-168.)

EAS27830

[A] CHECKING THE ABS WARNING LIGHT

Turn the main switch to "ON". (Do not start the engine.)

1. The ABS warning light does not come on. [B-1]
2. The ABS warning light flashes. [B-2]
3. The ABS warning light remains on. [B-3]
4. The ABS warning light comes on for 2 seconds, then goes off. [B-4]

ET3P6D006

[B-1] THE ABS WARNING LIGHT FAILS TO COME ON

1. Only the ABS warning light fails to come on when the main switch is turned to "ON". [C-1]
2. The ABS warning light and all other indicator lights fail to come on. [C-2]

ET3P6D008

[B-2] THE ABS WARNING LIGHT FLASHES

1. Test coupler adapter
   - Check if the test coupler adapter is connected to the ABS test coupler.
   - If the test coupler adapter is connected, disconnect it, and then install the protective cap onto the ABS test coupler.
   - If the test coupler adapter is not connected, refer to "[B-5] MALFUNCTION ARE CURRENTLY DETECTED" on page 8-135.

ET3P6D007

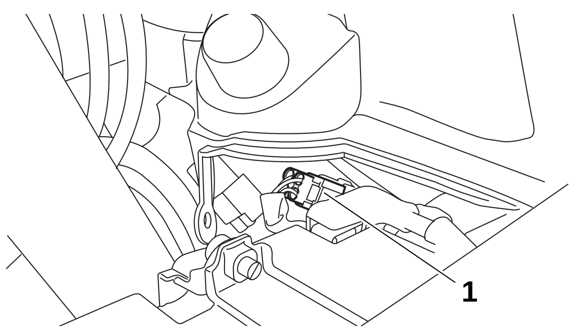
[B-3] THE ABS WARNING LIGHT REMAINS ON

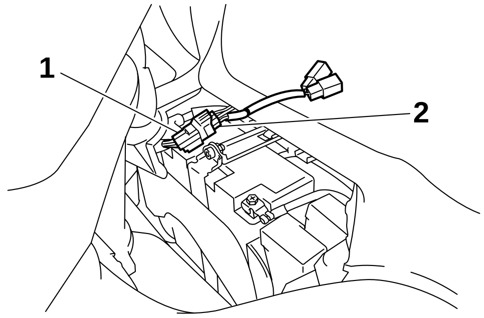
1. A malfunction is detected. [B-6]

ET3P6D010

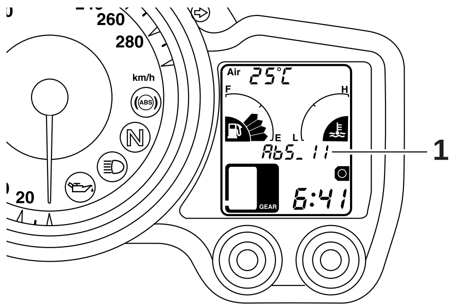
[B-4] THE ABS WARNING LIGHT COMES ON FOR 2 SECONDS, THEN GOES OFF

Remove front cowling right inner panel 1 to access the ABS test coupler "1". Remove the protective cap from the ABS test coupler, and then connect the test coupler adapter "2" to the coupler. The T/C terminal (sky blue) is now grounded.





1. The fault code “1” is displayed on the multi-function display (example: fault code AbS_11).



2. The ABS warning light flashes every 0.5 second for more than 6 seconds.
   The ABS warning light flashes every 0.5 second if a fault code for a past malfunction is not stored in the memory of the ABS ECU. The ABS warning light flashes quicker if a fault code is displayed on the multi-function display. If no fault code is displayed, make sure that the customer understands the possible conditions that may cause the ABS warning light to come on or flash even if the system is normal.

TIP

- The ABS fault codes will not be displayed if a fault code for the fuel injection system is displayed on the multi-function display. To display the ABS fault codes, delete the fuel injection system fault codes, and then start the check again.
- The test coupler adapter must be connected to the ABS test coupler to display the fault codes. If the adapter is not connected, the ABS warning light will come on or flash, but no fault codes will be displayed.

ET3P6D011

[B-5] MALFUNCTION ARE CURRENTLY DETECTED

Remove front cowling right inner panel 1 to access the ABS test coupler. Connect the test coupler adapter to the ABS test coupler.

When the test coupler adapter is connected to the ABS test coupler, the fault codes will be displayed in the multi-function display. Record all of the displayed fault codes.

1. No fault codes are displayed in the multi-function display and the ABS warning light is on. [C-3]
2. No fault codes are displayed in the multi-function display and the ABS warning light is flashing. [C-4]

ET3P6D012

[C-1] ONLY THE ABS WARNING LIGHT FAILS TO COME ON

1. Check for a short circuit to the ground between the green/red terminal of the ABS ECU coupler and green/red terminal of the meter assembly.
   - If there is not a short circuit to the ground, front cowling wire harness or the wire harness is defective. Properly repair or replace the defective harness.

2. Disconnect the ABS ECU coupler and check that the ABS warning light comes on when the main switch is turned to “ON”.
   - If the ABS warning light does not come on, the meter assembly circuit (including the ABS warning light [LED]) is defective. Replace the meter assembly.
   - If the ABS warning light comes on, ABS ECU is defective. Replace the hydraulic unit assembly.

ET3P6D013

[C-2] ALL INDICATOR LIGHTS FAIL TO COME ON

1. Main switch
   - Check the main switch for continuity.
     Refer to “CHECKING THE SWITCHES” on page 8-221.
   - If there is no continuity, replace the main switch.
2. Battery
   - Check the condition of the battery.
     Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-228.
   - If the battery is defective, clean the battery terminals and recharge it, or replace the battery.
3. Main fuse
   - Check the fuse for continuity.
     Refer to “CHECKING THE FUSES” on page 8-227.
   - If the main fuse is blown, replace the fuse.
4. Circuit
   - Check the meter assembly circuit.
     Refer to “CIRCUIT DIAGRAM (1/2) (FJR13A)” on page 8-117, “CIRCUIT DIAGRAM (2/2) (FJR13A)” on page 8-119, “CIRCUIT DIAGRAM (1/2) (FJR13AE)” on page 8-121, and “CIRCUIT DIAGRAM (2/2) (FJR13AE)” on page 8-123.
   - If the meter assembly circuit is open, properly repair or replace the front cowling wire harness.

ET3P6D014

[C-3] THE ABS WARNING LIGHT REMAINS ON

1. The battery voltage is low.
   - Check the condition of the battery.
     Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-228.
   - If the battery voltage is low, clean the battery terminals and recharge it, or replace the battery.
2. ABS ECU fuse
   - Check the ABS ECU fuse for continuity.
     Refer to “CHECKING THE FUSES” on page 8-227.
   - If the ABS ECU fuse is blown, replace the fuse.
3. ABS ECU coupler and front cowling wire harness coupler.
   - Check that the ABS ECU coupler and front cowling wire harness coupler are connected properly.
   - Connect the couplers properly if necessary.
4. There is a break in the wire harness between the main switch and the ABS ECU or between the ABS ECU and the ground.
   - Check for continuity between the brown/blue terminal of the main switch coupler and brown/blue terminal of the ABS ECU fuse.
   - Check for continuity between the brown/white terminal of the ABS ECU fuse and the brown/white terminal of the ABS ECU coupler.
   - If there is no continuity, the wire harness is defective. Properly repair or replace the wire harness.
   - Check for continuity between the black/white terminal of the ABS ECU coupler and the ground.
   - If there is no continuity, the wire harness is defective. Properly repair or replace the wire harness.
5. There is a break in the wire harness and front cowling wire harness between the ABS ECU and the meter assembly (ABS warning light).
   - Check for continuity between the green/red terminal of the ABS ECU coupler and the green/red terminal of the meter assembly coupler.

- If there is no continuity, the front cowling wire harness or the wire harness is defective. Properly repair or replace the defective harness.

6. The meter assembly circuit is defective.
   - Disconnect the ABS ECU coupler.
   - The green/red terminal of the ABS ECU coupler is short-circuited to the ground.
   - Turn the main switch to “ON”, and then check the ABS warning light.
   - If the ABS warning light is on, the internal circuit of the meter assembly is defective. Replace the meter assembly.
   - If the ABS warning light does not come on, the ABS ECU is defective. Replace the hydraulic unit assembly.
7. The hydraulic unit assembly is defective.

ET3P6D015

[C-4] THE ABS WARNING LIGHT FLASHES

1. Check whether the T/C terminal (sky blue) of the ABS test coupler is short-circuited to the ground when the test coupler adapter is removed.
   - If the T/C terminal is short-circuited to the ground, the wire harness is defective. Properly repair or replace the wire harness.
   - If the T/C terminal is not short-circuited to the ground, the internal circuit of the meter assembly is defective. Replace the meter assembly.

ET3P6D016

[C-5] DIAGNOSIS USING THE FAULT CODES

Connect the test coupler adapter to the ABS test coupler, and then turn the main switch to “ON”. Information for the fault codes from the ABS ECU is contained in the following table. Refer to this table for troubleshooting.

TIP

Record all of the fault codes displayed and inspect the check points.

Fault code table

Fault code No.	Symptom	Check point
AbS_11* AbS_25*	Front wheel sensor signal is not received properly.	• Installation of the front wheel sensor • Front wheel • Front wheel sensor housing • Front wheel sensor rotor
AbS_12	Rear wheel sensor signal is not received properly.	• Installation of the rear wheel sensor • Rear wheel • Rear wheel sensor housing • Rear wheel sensor rotor
AbS_13 AbS_26	Incorrect signal from the front wheel sensor is detected.	• Installation of the front wheel sensor • Front wheel • Front wheel sensor housing • Front wheel sensor rotor • Hydraulic unit assembly
AbS_14 AbS_27	Incorrect signal from the rear wheel sensor is detected.	• Installation of the rear wheel sensor • Rear wheel • Rear wheel sensor housing • Rear wheel sensor rotor • Hydraulic unit assembly

Fault code No.	Symptom	Check point
AbS_15	No continuity in the front wheel sensor circuit.	• Continuity of the front wheel sensor circuit • Wire harness (ABS circuit) • Connection of the front wheel sensor coupler and ABS ECU coupler • Front wheel sensor
AbS_16	No continuity in the rear wheel sensor circuit.	• Continuity of the rear wheel sensor circuit • Wire harness (ABS circuit) • Connection of the rear wheel sensor coupler and ABS ECU coupler • Rear wheel sensor
AbS_17 AbS_45	Missing pulses detected in the front wheel sensor signal.	• Front wheel sensor rotor • Front wheel sensor housing • Front wheel
AbS_18 AbS_46	Missing pulses detected in the rear wheel sensor signal.	• Rear wheel sensor rotor • Rear wheel sensor housing • Rear wheel
AbS_21	Hydraulic unit solenoid circuit is open or short-circuited.	• Hydraulic unit assembly
AbS_22	Start switch signal is not received properly (start switch circuit or start switch monitor circuit).	• Wire harness and front cowling wire harness • Connection of the relay unit coupler and ABS ECU coupler.
AbS_23	Brake light signal is not received properly when main switch is turned to “ON” (brake light circuit, or front or rear brake light switch circuit).	• Improper adjustment of the rear brake light switch • Brake light switches • Brake light relay • Wire harness and front cowling wire harness brake light switch circuit • Brake light system couplers and connectors
AbS_24	Brake light signal is not received properly while vehicle is traveling (brake light circuit, or front or rear brake light switch circuit).	• Brake light relay • Brake light bulbs • Wire harness and front cowling wire harness (brake light circuit) • Brake light system couplers and connectors
AbS_31	Solenoid relay is defective. Power is not supplied to the solenoid relay.	• ABS solenoid fuse • Wire harness (battery and ABS ECU circuit) • Connection of the ABS ECU coupler • Hydraulic unit assembly
AbS_32	Hydraulic unit solenoid relay is short-circuited.	• Hydraulic unit assembly
AbS_33	ABS motor is defective. Power is not supplied to the ABS motor.	• Battery voltage • ABS motor fuse • Wire harness (ABS circuit) • Connection of the ABS ECU coupler and starter relay coupler • Hydraulic unit assembly
AbS_34	Hydraulic unit ABS motor relay is short-circuited.	• Hydraulic unit assembly

Fault code No.	Symptom	Check point
AbS_41	Front wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic pressure.	• Brake dragging • Brake fluid • Hydraulic unit operation tests • Front wheel brake lines • Hydraulic unit assembly
AbS_42	Rear wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic pressure.	• Brake dragging • Brake fluid • Hydraulic unit operation tests • Rear wheel brake lines • Hydraulic unit assembly
AbS_43	Incorrect signal from the front wheel sensor is detected.	• Installation of the front wheel sensor • Front wheel sensor housing • Front wheel sensor rotor
AbS_44	Incorrect signal from the rear wheel sensor is detected.	• Installation of the rear wheel sensor • Rear wheel sensor housing • Rear wheel sensor rotor
AbS_51 AbS_52	Power voltage is too high.	• Battery voltage • Battery terminal • Refer to “CHARGING SYSTEM” on page 8-29.
AbS_53	Power voltage is too low.	• Battery voltage • Connection of the ABS ECU coupler • Wire harness • Refer to “CHARGING SYSTEM” on page 8-29.
AbS_54	Power voltage is too low.	• Battery voltage • Connection of the ABS ECU coupler and starter relay coupler • Wire harness • Refer to “CHARGING SYSTEM” on page 8-29.
AbS_56	Hydraulic unit sensor power monitor circuit is abnormal.	• Hydraulic unit assembly
AbS_63	Front wheel sensor power is abnormal.	• Front wheel sensor lead • Wire harness • Hydraulic unit assembly
AbS_64	Rear wheel sensor power is abnormal.	• Rear wheel sensor lead • Wire harness • Hydraulic unit assembly

* A fault code is indicated if the rear wheel rotates for longer than about 20 seconds (fault code No. AbS_11) or for longer than about 2 seconds (fault code No. AbS_25) with the front wheel stopped (e.g., when the vehicle is on the centerstand).

TIP

Fault codes Nos. AbS_15 (front wheel) and AbS_16 (rear wheel) are indicated if a defective connection is detected in the front or rear wheel sensor when the vehicle is not being ridden.

Fault code No.		AbS_11 AbS_25	Symptom	Front wheel sensor signal is not received properly.	
Order	**Item/components and probable cause**			**Check or maintenance job**	**Reinstatement confirmation method**
1	Installed condition of wheel sensor.			Check for looseness. Repair or replace the wheel sensor if necessary.	• Turn the main switch to "ON" and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform a trial run at a constant speed of 30 km/h and check that the ABS warning light does not come on.
2	Installed condition of wheel bearings, axle, sensor housing, and sensor rotor.			Check the components for looseness, distortion, and bends. Refer to "CHECKING THE FRONT WHEEL" on page 4-19.	
3	Foreign material inside sensor housing.			Check the interior of the sensor housing and the surface of the sensor rotor for foreign material, such as metal particles. Clean the sensor housing and sensor rotor if necessary. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20.	
4	Defective sensor rotor.			Check the surface of the sensor rotor for damage. Replace the sensor rotor if there is visible damage. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20.	

TIP

With front wheel stopped, rear wheel was rotated for longer than about 20 seconds (fault code No. AbS_11) or for longer than about 2 seconds (fault code No. AbS_25).

<table>
<tr><th colspan="2">Fault code No.</th><th>AbS_12</th><th>Symptom</th><th colspan="2">Rear wheel sensor signal is not received properly.</th></tr>
<tr><th>Order</th><th colspan="3">Item/components and probable cause</th><th>Check or maintenance job</th><th>Reinstatement confirmation method</th></tr>
<tr><td>1</td><td colspan="3">Installed condition of wheel sensor.</td><td>Check for looseness. Repair or replace the wheel sensor if necessary.</td><td rowspan="4">• Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off.
• Perform a trial run at a constant speed of 30 km/h and check that the ABS warning light does not come on.</td></tr>
<tr><td>2</td><td colspan="3">Installed condition of wheel bearings, axle, sensor housing, and sensor rotor.</td><td>Check the components for looseness, distortion, and bends.
Refer to “CHECKING THE REAR WHEEL” on page 4-28.</td></tr>
<tr><td>3</td><td colspan="3">Foreign material inside sensor housing.</td><td>Check the interior of the sensor housing and the surface of the sensor rotor for foreign material, such as metal particles. Clean the sensor housing and sensor rotor if necessary.
Refer to “MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR” on page 4-28.</td></tr>
<tr><td>4</td><td colspan="3">Defective sensor rotor.</td><td>Check the surface of the sensor rotor for damage. Replace the sensor rotor if there is visible damage.
Refer to “MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR” on page 4-28.</td></tr>
</table>

Fault code No.	AbS_13 AbS_26	Symptom	Incorrect signal from the front wheel sensor is detected.

Order	Item/components and probable cause	Check or maintenance job	Reinstatement confirmation method
1	Installed condition of wheel sensor.	Check for looseness. Repair or replace the wheel sensor if necessary.	• Turn the main switch to "ON" and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform a trial run at a constant speed of 30 km/h and check that the ABS warning light does not come on.
2	Installed condition of wheel bearings, axle, sensor housing, and sensor rotor.	Check the components for looseness, distortion, and bends. Refer to "CHECKING THE FRONT WHEEL" on page 4-19.	
3	Foreign material inside sensor housing.	Check the interior of the sensor housing and the surface of the sensor rotor for foreign material, such as metal particles. Clean the sensor housing and sensor rotor if necessary. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20.	
4	Defective sensor rotor.	Check the surface of the sensor rotor for damage. If there is visible damage, replace the sensor rotor. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20.	
5	Hydraulic unit assembly internal malfunction.	Replace the hydraulic unit assembly.	

TIP

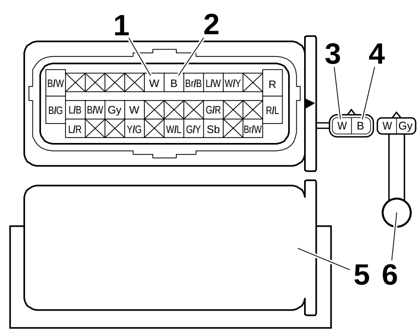
Vehicle possibly ridden on uneven roads.

Fault code No.	AbS_14 AbS_27	Symptom	Incorrect signal from the rear wheel sensor is detected.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement confirmation method**
1	Installed condition of wheel sensor.	Check for looseness. Repair or replace the wheel sensor if necessary.	• Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform a trial run at a constant speed of 30 km/h and check that the ABS warning light does not come on.
2	Installed condition of wheel bearings, axle, sensor housing, and sensor rotor.	Check the components for looseness, distortion, and bends. Refer to “CHECKING THE REAR WHEEL” on page 4-28.	
3	Foreign material inside sensor housing.	Check the interior of the sensor housing and the surface of the sensor rotor for foreign material, such as metal particles. Clean the sensor housing and sensor rotor if necessary. Refer to “MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR” on page 4-28.	
4	Defective sensor rotor.	Check the surface of the sensor rotor for damage. If there is visible damage, replace the sensor rotor. Refer to “MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR” on page 4-28.	
5	Hydraulic unit assembly internal malfunction.	Replace the hydraulic unit assembly.	

TIP

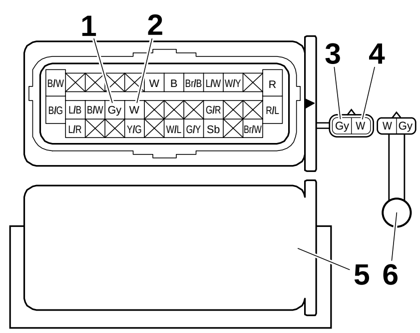
Vehicle possibly ridden on uneven roads.

Fault code No.	AbS_15	Symptom	No continuity in the front wheel sensor circuit.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement confirmation method**
1	Connections • Front wheel sensor coupler • ABS ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. **TIP** Turn the main switch to “OFF” before disconnecting or connecting a coupler.	Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off.

<table>
<tr><th colspan="2">Fault code No.</th><th>AbS_15</th><th>Symptom</th><th colspan="2">No continuity in the front wheel sensor circuit.</th></tr>
<tr><th>Order</th><th colspan="3">Item/components and probable cause</th><th>Check or maintenance job</th><th>Reinstatement confirmation method</th></tr>
<tr><td>2</td><td colspan="3">Wire harness continuity.</td><td>• Check for continuity between the white terminal “1” and the white terminal “3” and between the black terminal “2” and the black terminal “4”.
• If there is no continuity, the wire harness is defective. Properly repair or replace the wire harness.
• Check that there is no continuity between the ground and the white terminal “1” or white terminal “3” and between the ground and the black terminal “2” or black terminal “4”.
• If there is continuity, the wire harness is defective. Properly repair or replace the wire harness.
• Check that there is no continuity between the white terminal “1” and the black terminal “2” and between the white terminal “3” and the black terminal “4”.
• If there is continuity, the wire harness is defective. Properly repair or replace the wire harness.

5. ABS ECU
6. Front wheel sensor</td><td></td></tr>
</table>

Fault code No.	AbS_15	Symptom	No continuity in the front wheel sensor circuit.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement confirmation method**
3	Defective wheel sensor.	If the above items were performed and no malfunctions were found, connect the ABS ECU coupler and front wheel sensor coupler, and then delete the fault codes. If fault code No. AbS_15 could not be deleted, the front wheel sensor is defective. Replace the front wheel sensor. **TIP** Before deleting the fault codes, record all of the fault codes and perform the related checks and maintenance.	

Fault code No.	AbS_16	Symptom	No continuity in the rear wheel sensor circuit.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement confirmation method**
1	Connections • Rear wheel sensor coupler • ABS ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. **TIP** Turn the main switch to “OFF” before disconnecting or connecting a coupler.	Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off.

Fault code No.	**AbS_16**	**Symptom**	**No continuity in the rear wheel sensor circuit.**	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
2	Wire harness continuity.		• Check for continuity between the gray terminal “1” and the gray terminal “3” and between the white terminal “2” and the white terminal “4”. • If there is no continuity, the wire harness is defective. Properly repair or replace the wire harness. • Check that there is no continuity between the ground and the gray terminal “1” or gray terminal “3” and between the ground and the white terminal “2” or white terminal “4”. • If there is continuity, the wire harness is defective. Properly repair or replace the wire harness. • Check that there is no continuity between the gray terminal “1” and the white terminal “2” and between the gray terminal “3” and the white terminal “4”. • If there is continuity, the wire harness is defective. Properly repair or replace the wire harness.  5. ABS ECU 6. Rear wheel sensor	

Fault code No.	AbS_16	Symptom	No continuity in the rear wheel sensor circuit.	
Order	**Item/components and probable cause**		**Check or maintenance job**	**Reinstatement confirmation method**
3	Defective wheel sensor.		If the above items were performed and no malfunctions were found, connect the ABS ECU coupler and rear wheel sensor coupler, and then delete the fault codes. If fault code No. AbS_16 could not be deleted, the rear wheel sensor is defective. Replace the rear wheel sensor. **TIP** Before deleting the fault codes, record all of the fault codes and perform the related checks and maintenance.	

Fault code No.	AbS_17 AbS_45	Symptom	Missing pulses detected in the front wheel sensor signal.

Order	Item/components and probable cause	Check or maintenance job	Reinstatement confirmation method
1	Installed condition of wheel bearings, axle, sensor housing, and sensor rotor.	Check the components for looseness, distortion, and bends. Refer to “CHECKING THE FRONT WHEEL” on page 4-19.	• Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform a trial run at a constant speed of 30 km/h and check that the ABS warning light does not come on.
2	Foreign material inside sensor housing.	Check the interior of the sensor housing and the surface of the sensor rotor for foreign material, such as metal particles. Clean the sensor housing and sensor rotor if necessary. Refer to “MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR” on page 4-20.	
3	Defective sensor rotor.	• Check the surface of the sensor rotor for damage. • If there is visible damage, replace the sensor rotor.	

Fault code No.	AbS_18 AbS_46	Symptom	Missing pulses detected in the rear wheel sensor signal.

Order	Item/components and probable cause	Check or maintenance job	Reinstatement confirmation method
1	Installed condition of wheel bearings, axle, sensor housing, and sensor rotor.	Check the components for looseness, distortion, and bends. Refer to “CHECKING THE REAR WHEEL” on page 4-28.	• Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform a trial run at a constant speed of 30 km/h and check that the ABS warning light does not come on.
2	Foreign material inside sensor housing.	Check the interior of the sensor housing and the surface of the sensor rotor for foreign material, such as metal particles. Clean the sensor housing and sensor rotor if necessary. Refer to “MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR” on page 4-28.	
3	Defective sensor rotor.	• Check the surface of the sensor rotor for damage. • If there is visible damage, replace the sensor rotor.	

Fault code No.	AbS_21	Symptom	Hydraulic unit solenoid circuit is open or short-circuited.

Order	Item/components and probable cause	Check or maintenance job	Reinstatement confirmation method
1	Open or short circuit in solenoid circuit.	Replace the hydraulic unit assembly.	• Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform hydraulic unit operation test 1 and check that the operation of the hydraulic unit is normal.

Fault code No.	AbS_22	Symptom	Start switch signal is not received properly (start switch circuit or start switch monitor circuit).

Order	Item/components and probable cause	Check or maintenance job	Reinstatement confirmation method
1	Engine startability.	Check the electric starting system. Refer to “ELECTRIC STARTING SYSTEM” on page 8-13.	• Push the start switch and check that the engine starts. • Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off. • Check that the ABS warning light comes on while the start switch is being pushed.
2	Connections • Starter relay coupler • ABS ECU coupler • Right handlebar switch coupler • Front cowling wire harness coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. **TIP** Turn the main switch to “OFF” before disconnecting or connecting a coupler.	
3	Open or short circuit in wire harness and front cowling wire harness.	• Repair or replace if there is an open or short circuit. • Between ABS ECU coupler and starter relay coupler. (blue/white–blue/white) • Between ABS ECU coupler and right handlebar switch (start switch) coupler. (white/blue–white/blue)	

<table>
<tr><th>Fault code No.</th><th>AbS_23</th><th>Symptom</th><th colspan="2">Brake light signal is not received properly when main switch is turned to “ON” (brake light circuit, or front or rear brake light switch circuit).</th></tr>
<tr><th>Order</th><th colspan="2">Item/components and probable cause</th><th>Check or maintenance job</th><th>Reinstatement confirmation method</th></tr>
<tr><td>1</td><td colspan="2">Brake light operation.
• Burned-out brake light bulb
• Defective brake light relay
• Improperly adjusted rear brake light switch
• Defective front and rear brake light switches</td><td>• Check the brake light. Repair or replace the brake light if necessary.
Refer to “CHECKING THE BULBS AND BULB SOCKETS” on page 8-226.
• Check the brake light relay.
Refer to “CHECKING THE RELAYS” on page 8-231.
• Check the rear brake light switch for proper adjustment.
Refer to “ADJUSTING THE REAR BRAKE LIGHT SWITCH” on page 3-30.
• Check the front and rear brake light switches.
Refer to “CHECKING THE SWITCHES” on page 8-221.</td><td rowspan="4">• Check that the brake light comes on when the front or rear brake is applied.
• Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off.</td></tr>
<tr><td>2</td><td colspan="2">Connections
• ABS ECU coupler
• Brake light relay coupler
• Front brake light switch connectors
• Rear brake light switch coupler
• Front cowling wire harness coupler</td><td>• Check the coupler for any pins that may be pulled out.
• Check the locking condition of the coupler.
• If there is a malfunction, repair it and connect the coupler securely.
TIP
Turn the main switch to “OFF” before disconnecting or connecting a coupler.</td></tr>
<tr><td>3</td><td colspan="2">Open or short circuit in wire harness.</td><td>• Repair or replace if there is an open or short circuit.
• Between ABS ECU coupler and brake light relay coupler.
(yellow/green–yellow/green)
• Between rear brake light switch coupler and ABS ECU coupler.
(brown/black–brown/black)
• Between front brake light switch connectors and ABS ECU coupler.
(green/yellow–green/yellow)</td></tr>
<tr><td>4</td><td colspan="2">Water inside switch.</td><td>Use compressed air to blow out the water.</td></tr>
</table>

Fault code No.	AbS_24	Symptom	Brake light signal is not received properly while vehicle is traveling (brake light circuit, or front or rear brake light switch circuit).
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement confirmation method**
1	Brake light operation. • Burned-out brake light bulb • Defective brake light relay	• Check the brake light. Repair or replace the brake light if necessary. Refer to “CHECKING THE BULBS AND BULB SOCKETS” on page 8-226. • Check the brake light relay. Refer to “CHECKING THE RELAYS” on page 8-231.	• Check that the brake light comes on when the front or rear brake is applied. • Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off. • Check that the ABS warning light does not flash when the front, rear, or both brakes are applied for 2 seconds or more.
2	Connections • ABS ECU coupler • Brake light relay coupler • Front brake light switch connectors • Rear brake light switch coupler • Front cowling wire harness coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. **TIP** Turn the main switch to “OFF” before disconnecting or connecting a coupler.	
3	Open or short circuit in wire harness and/or front cowling wire harness.	• Repair or replace if there is an open or short circuit. • Between ABS ECU coupler and brake light relay coupler. (yellow/green–yellow/green) • Between rear brake light switch coupler and ABS ECU coupler. (brown/black–brown/black) • Between front brake light switch connectors and ABS ECU coupler. (green/yellow–green/yellow)	
4	Water inside switch.	Use compressed air to blow out the water.	

Fault code No.	AbS_31	Symptom	Solenoid relay is defective. Power is not supplied to the solenoid relay.

Order	Item/components and probable cause	Check or maintenance job	Reinstatement confirmation method
1	Battery voltage	Recharge or replace the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 3-44.	Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off.
2	Blown ABS solenoid fuse.	Check the ABS solenoid fuse. If the ABS solenoid fuse is blown, replace the fuse and check the wire harness. Refer to “CHECKING THE FUSES” on page 3-44.	
3	Connections • ABS ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. **TIP** Turn the main switch to “OFF” before disconnecting or connecting a coupler.	
4	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between ABS ECU coupler and ABS solenoid fuse. (red–red)	
5	Hydraulic unit assembly internal malfunction.	Replace the hydraulic unit assembly.	

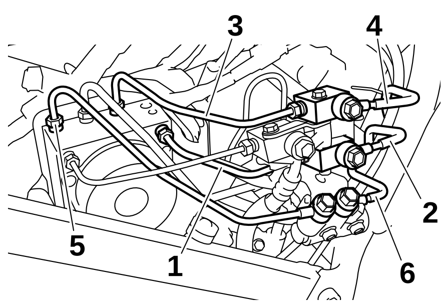
<table>
<tr><th colspan="2">Fault code No.</th><th>AbS_32</th><th>Symptom</th><th colspan="2">Hydraulic unit solenoid relay is short-circuited.</th></tr>
<tr><th>Order</th><th colspan="3">Item/components and probable cause</th><th>Check or maintenance job</th><th>Reinstatement confirmation method</th></tr>
<tr><td>1</td><td colspan="3">Short circuit in solenoid relay.</td><td>Replace the hydraulic unit assembly.</td><td rowspan="2">• Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off.
• Perform hydraulic unit operation test 1 and check that the operation of the hydraulic unit is normal.</td></tr>
<tr><td>2</td><td colspan="3">Hydraulic unit assembly internal malfunction.</td><td>Replace the hydraulic unit assembly.</td></tr>
</table>

Fault code No.	AbS_33	Symptom	ABS motor is defective. Power is not supplied to the ABS motor.

Order	Item/components and probable cause	Check or maintenance job	Reinstatement confirmation method
1	Battery voltage	Recharge or replace the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 3-44.	• Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform hydraulic unit operation test 1 and check that the operation of the hydraulic unit is normal.
2	Blown ABS motor fuse.	Check the ABS motor fuse. If the ABS motor fuse is blown, replace the fuse and check the wire harness. Refer to “CHECKING THE FUSES” on page 3-44.	
3	Connections • ABS ECU coupler • Starter relay coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. **TIP** Turn the main switch to “OFF” before disconnecting or connecting a coupler.	
4	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between ABS ECU coupler and starter relay coupler. (red/blue–red/blue) • Between ABS ECU coupler and ground. (black/green–black/green)	
5	Hydraulic unit assembly internal malfunction.	Replace the hydraulic unit assembly.	

Fault code No.	AbS_34	Symptom	Hydraulic unit ABS motor relay is short-circuited.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement confirmation method**
1	Short circuit in ABS motor relay.	Replace the hydraulic unit assembly.	• Turn the main switch to "ON" and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform hydraulic unit operation test 1 and check that the operation of the hydraulic unit is normal.

Fault code No.	AbS_41	Symptom	Front wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic pressure (when the battery voltage is normal)
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement confirmation method**
1	Rotation of wheel	• Check that there is no brake disc drag on the front wheel and make sure that it rotates smoothly. • Check the front wheel axle for loose bearings and bends, and the brake discs for distortion. Refer to "CHECKING THE FRONT BRAKE DISCS" on page 4-37.	Perform hydraulic unit operation test 1 and check that the operation of the hydraulic unit is normal.
2	Brake master cylinder and brake caliper	• Check that the brake fluid pressure is correctly transmitted to the brake calipers when the brake lever is operated and that the pressure decreases when the lever is released.	
3	Brake fluid	• Visually check the brake fluid in the brake master cylinder reservoir and the brake fluid reservoir for water, foreign materials, solidification, and contamination. • Check for air in the brake lines.	

Fault code No.	AbS_41	Symptom	Front wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic pressure (when the battery voltage is normal)
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement confirmation method**
4	Brake lines	• Check the brake lines for kinks and deterioration. EWA3P6D005 **WARNING** **Only use genuine Yamaha parts. Using other brake pipes, hoses and union bolts may close the brake lines.** • Check that the connections of the brake lines from the brake master cylinder to the hydraulic unit and from the hydraulic unit to the front brake calipers and the metering valve are correct.  See WARNING and NOTE.	

Fault code No.	AbS_41	Symptom	Front wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic pressure (when the battery voltage is normal)

Order	Item/components and probable cause	Check or maintenance job	Reinstatement confirmation method
5	Hydraulic unit assembly	If the malfunction is not corrected after checking items (1) to (4), replace the hydraulic unit assembly. Be sure to connect the brake pipes and coupler correctly and securely. Check the hydraulic unit operation. Refer to "HYDRAULIC UNIT OPERATION TESTS" on page 4-66.	

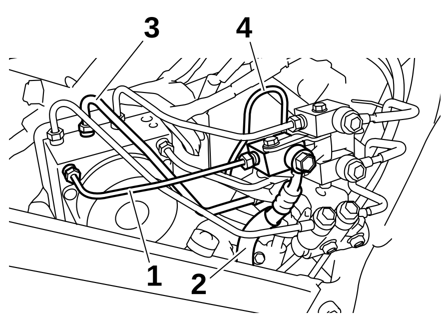
EWA3P6D006

WARNING

The front brakes will not function properly if the connections are reversed.
- **Brake pipe/lower joint assembly "1" and brake pipe "2" inlet: from the front brake master cylinder**
- **Brake pipe/upper joint assembly "3" and brake pipe "4" outlet: to the front brake calipers**
- **Brake pipe "5" outlet: to the metering valve**
- **Brake pipe "6" outlet: to the right front brake caliper**

TIP

- If the brake pipe inlet and outlet connections are incorrect on the hydraulic unit, the brake lever will be pulled to its full-stroke position without responding, and then it will be pushed back slowly without pulsating when the final check on page "[D-3] FINAL CHECK" on page 8-168 is performed.
- If the front and rear brake pipe connections are reversed on the hydraulic unit, the pulsating action in the brake lever and brake pedal will be performed in the reverse order when the final check on page "[D-3] FINAL CHECK" on page 8-168 is performed.
- If the brake pipes (to the proportioning valve and the metering valve) are switched during assembly, the brakes will continue to operate as normal. However, the reduction of the hydraulic pressure for the rear brake and part of the right front brake will be reversed during the ABS operation when the final check on page "[D-3] FINAL CHECK" on page 8-168 is performed.

Fault code No.	**AbS_42**	**Symptom**	**Rear wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic pressure.**
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement confirmation method**
1	Rotation of wheel	• Check that there is no brake disc drag on the rear wheel and make sure that it rotates smoothly. • Check for brake disc distortion. Refer to “CHECKING THE REAR BRAKE DISC” on page 4-50.	Perform hydraulic unit operation test 1 and check that the operation of the hydraulic unit is normal.
2	Brake master cylinder and brake caliper	• Check that the brake fluid pressure is correctly transmitted to the brake caliper when the brake pedal is operated and that the pressure decreases when the pedal is released.	
3	Brake fluid	• Visually check the brake fluid in the brake fluid reservoir for water, foreign materials, solidification, and contamination. • Check for air in the brake lines.	
4	Brake lines	• Check the brake lines for kinks and deterioration (particularly between the hydraulic unit and the rear brake caliper). EWA3P6D005 **WARNING** **Only use genuine Yamaha parts. Using other brake pipes, hoses and union bolts may close the brake lines.** • Check that the connections of the brake lines from the brake master cylinder to the hydraulic unit and from the hydraulic unit to the proportioning valve are correct.  See WARNING and NOTE.	

Fault code No.	AbS_42	Symptom	Rear wheel will not recover from the locking tendency even though the signal is continuously transmitted from the ABS ECU to release the hydraulic pressure.

Order	Item/components and probable cause	Check or maintenance job	Reinstatement confirmation method
5	Hydraulic unit assembly	If the malfunction is not corrected after checking items (1) to (4), replace the hydraulic unit assembly. Be sure to connect the brake hose, brake pipe, and coupler correctly and securely. Check the hydraulic unit operation. Refer to “HYDRAULIC UNIT OPERATION TESTS” on page 4-66.	

EWA3P6D007

WARNING

The rear brake will not function properly if the connections are reversed.
- **Brake pipe/middle joint assembly “1” and brake hose “2” inlet: from the rear brake master cylinder**
- **Brake pipe “3” outlet: to the proportioning valve**
- **Brake pipe “4” outlet: to the rear brake caliper**

TIP

- If the brake pipe inlet and outlet connections are reversed on the hydraulic unit, the brake pedal will be pressed down to its full-stroke position without responding, and then it will be pushed back slowly without pulsating when the final check on page “[D-3] FINAL CHECK” on page 8-168 is performed.
- If the front and rear brake pipe connections are reversed on the hydraulic unit, the pulsating action in the brake lever and brake pedal will be performed in the reverse order when the final check on page “[D-3] FINAL CHECK” on page 8-168 is performed.
- If the brake pipes (to the proportioning valve and the metering valve) are switched during assembly, the brakes will continue to operate as normal. However, the reduction of the hydraulic pressure for the rear brake and part of the right front brake will be reversed during the ABS operation when the final check on page “[D-3] FINAL CHECK” on page 8-168 is performed.

Fault code No.	AbS_43	Symptom	Incorrect signal from the front wheel sensor is detected.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement confirmation method**
1	Installed condition of wheel sensor.	Check for looseness. Repair or replace the wheel sensor if necessary.	• Turn the main switch to "ON" and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform a trial run at a constant speed of 30 km/h and check that the ABS warning light does not come on.
2	Installed condition of wheel bearings, axle, sensor housing, and sensor rotor.	Check the components for looseness, distortion, and bends. Refer to "CHECKING THE FRONT WHEEL" on page 4-19.	
3	Foreign material inside sensor housing.	Check the interior of the sensor housing and the surface of the sensor rotor for foreign material, such as metal particles. Clean the sensor housing and sensor rotor if necessary. Refer to "MAINTENANCE OF THE FRONT WHEEL SENSOR AND SENSOR ROTOR" on page 4-20.	
4	Defective sensor rotor.	• Check the surface of the sensor rotor for damage. • If there is visible damage, replace the sensor rotor.	

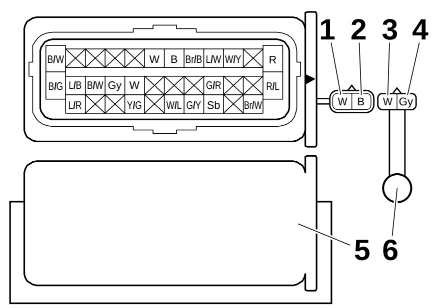
Fault code No.	AbS_44	Symptom	Incorrect signal from the rear wheel sensor is detected.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement confirmation method**
1	Installed condition of wheel sensor.	Check for looseness. Repair or replace the wheel sensor if necessary.	• Turn the main switch to "ON" and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform a trial run at a constant speed of 30 km/h and check that the ABS warning light does not come on.
2	Installed condition of wheel bearings, axle, sensor housing, and sensor rotor.	Check the components for looseness, distortion, and bends. Refer to "CHECKING THE REAR WHEEL" on page 4-28.	
3	Foreign material inside sensor housing.	Check the interior of the sensor housing and the surface of the sensor rotor for foreign material, such as metal particles. Clean the sensor housing and sensor rotor if necessary. Refer to "MAINTENANCE OF THE REAR WHEEL SENSOR AND SENSOR ROTOR" on page 4-28.	
4	Defective sensor rotor.	• Check the surface of the sensor rotor for damage. • If there is visible damage, replace the sensor rotor.	

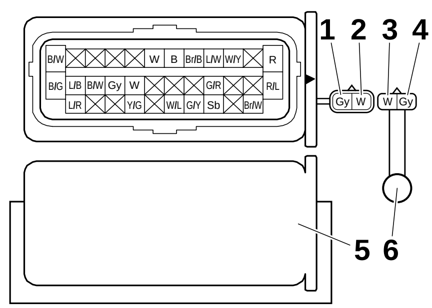
Fault code No.	AbS_51 AbS_52	Symptom	Power voltage is too high.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement confirmation method**
1	Battery voltage	Replace the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 3-44.	• Turn the main switch to "ON" and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform a trial run and check that the ABS warning light does not come on.
2	Disconnected battery terminal (fault code No. AbS_52).	Check the connection. Replace or reconnect the terminal if necessary.	
3	Charging system	Check the charging system. Refer to "CHARGING SYSTEM" on page 8-29.	

Fault code No.	AbS_53	Symptom	Power voltage is too low.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement confirmation method**
1	Battery voltage	Recharge or replace the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 3-44.	• Turn the main switch to "ON" and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform a trial run and check that the ABS warning light does not come on.
2	Connections • ABS ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely. **TIP** Turn the main switch to "OFF" before disconnecting or connecting a coupler.	
3	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between ABS ECU coupler and ABS ECU fuse. (brown/white–brown/white)	
4	Charging system	Check the charging system. Refer to "CHARGING SYSTEM" on page 8-29.	

<table>
<tr><th>Fault code No.</th><th>AbS_54</th><th>Symptom</th><th colspan="2">Power voltage is too low.</th></tr>
<tr><th>Order</th><th colspan="2">Item/components and probable cause</th><th>Check or maintenance job</th><th>Reinstatement confirmation method</th></tr>
<tr><td>1</td><td colspan="2">Battery voltage</td><td>Recharge or replace the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 3-44.</td><td rowspan="4">• Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off.
• Perform a trial run and check that the ABS warning light does not come on.</td></tr>
<tr><td>2</td><td colspan="2">Connections
• ABS ECU coupler
• Starter relay coupler</td><td>• Check the coupler for any pins that may be pulled out.
• Check the locking condition of the coupler.
• If there is a malfunction, repair it and connect the coupler securely.
TIP
Turn the main switch to “OFF” before disconnecting or connecting a coupler.</td></tr>
<tr><td>3</td><td colspan="2">Open or short circuit in wire harness.</td><td>• Repair or replace if there is an open or short circuit.
• Between ABS ECU coupler and ABS ECU fuse. (brown/white–brown/white)
• Between ABS ECU coupler and ABS solenoid fuse. (red–red)
• Between ABS ECU coupler and starter relay coupler. (red/blue–red/blue)</td></tr>
<tr><td>4</td><td colspan="2">Charging system</td><td>Check the charging system. Refer to “CHARGING SYSTEM” on page 8-29.</td></tr>
</table>

Fault code No.		AbS_56	Symptom	Hydraulic unit sensor power monitor circuit is abnormal.	
Order	**Item/components and probable cause**			**Check or maintenance job**	**Reinstatement confirmation method**
1	Defective internal monitor circuit (sensor power).			Replace the hydraulic unit assembly.	• Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off. • Perform hydraulic unit operation test 1 and check that the operation of the hydraulic unit is normal.

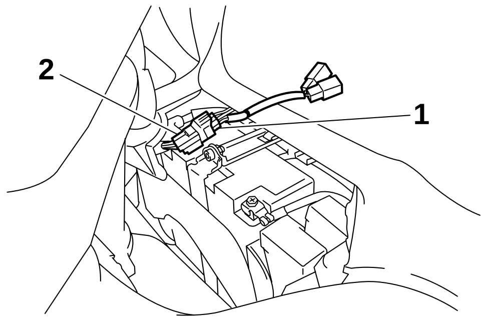
Fault code No.	**AbS_63**	**Symptom**	**Front wheel sensor power is abnormal.**
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement confirmation method**
1	Short circuit in wire harness.	• Check that there is no short circuit between the white terminal “1” and the black terminal “2”. • Check that there is no short circuit between the frame ground and the black terminal “2”. • If there is a short circuit, the wire harness is defective. Properly repair or replace the wire harness. **TIP** Disconnect the ABS ECU coupler before checking the wire harness.	Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off.
2	Short circuit in front wheel sensor lead.	• Check that there is no short circuit between the white terminal “3” and the gray terminal “4”. • Check that there is no short circuit between the frame ground and the white terminal “3”. • If there is a short circuit, the front wheel sensor is defective. Properly repair or replace the front wheel sensor.  5. ABS ECU 6. Rear wheel sensor	
3	Hydraulic unit internal malfunction.	Replace the hydraulic unit assembly.	

Fault code No.	**AbS_64**	**Symptom**	**Rear wheel sensor power is abnormal.**
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement confirmation method**
1	Short circuit in wire harness.	• Check that there is no short circuit between the gray terminal “1” and the white terminal “2”. • Check that there is no short circuit between the frame ground and the white terminal “2”. • If there is a short circuit, the wire harness is defective. Properly repair or replace the wire harness. **TIP** Disconnect the ABS ECU coupler before checking the wire harness.	Turn the main switch to “ON” and check that the ABS warning light comes on for 2 seconds, then goes off.
2	Short circuit in rear wheel sensor lead.	• Check that there is no short circuit between the white terminal “3” and the gray terminal “4”. • Check that there is no short circuit between the frame ground and the white terminal “3”. • If there is a short circuit, the rear wheel sensor is defective. Properly repair or replace the rear wheel sensor.  5. ABS ECU 6. Rear wheel sensor	
3	Hydraulic unit internal malfunction.	Replace the hydraulic unit assembly.	

ET3P6D017

[D-1] DELETING THE FAULT CODES

1. Connect the test coupler adapter “1” to the ABS test coupler “2”. Refer to “[B-5] MALFUNCTION ARE CURRENTLY DETECTED” on page 8-135.



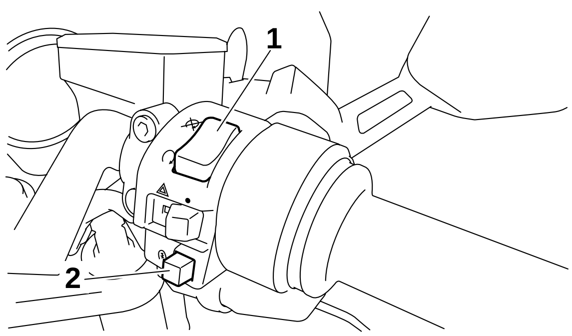
2. Turn the main switch to “ON”. Fault codes will be displayed in the multi-function display.
3. Set the engine stop switch “1” to “⊠”.

EC3P61014

NOTICE

If the start switch is pushed without setting the engine stop switch to “⊠”, the starter motor gears or other parts may be damaged.

4. Push the start switch “2” at least 10 times in 4 seconds to delete the fault codes.



5. The multi-function display switches to the odometer/tripmeter/fuel reserve tripmeter display and the ABS warning light flashes in 0.5 second-intervals while the fault codes are being deleted.
6. Turn the main switch to “OFF”.
7. Turn the main switch to “ON” again.

TIP

If fault codes are still displayed in the multi-function display, the malfunctions have not been repaired. Diagnose the malfunctions using the fault codes.

8. Turn the main switch to “OFF”.
9. Disconnect the test coupler adapter from the ABS test coupler, and then install the protective cap onto the ABS test coupler. Deleting the fault codes is now finished.

TIP

Do not forget to install the protective cap onto the ABS test coupler.

ECA3P6D014

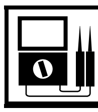
NOTICE

Since the fault codes remain in the memory of the ABS ECU until they are deleted, always delete the fault codes after the service has been completed.

ET3P61020

[D-2] DELETE FUNCTION TEST

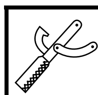
1. Place the vehicle on the centerstand.
2. Turn the main switch to “OFF”.
3. Connect the test coupler adapter to the ABS test coupler.
4. Turn the main switch to “ON”.
5. Check:
   - ABS ECU voltage
     Lower than 12.8 V → Charge or replace the battery.



Battery voltage
Higher than 12.8 V

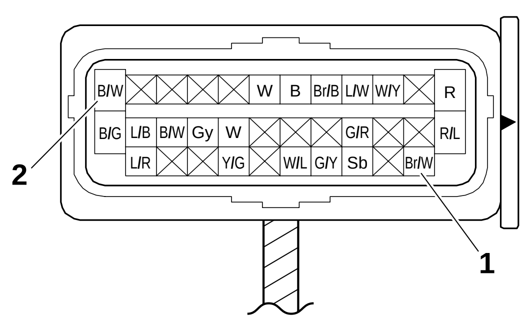
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a. Connect the pocket tester (DC 20 V) to the ABS ECU coupler.



Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

- Positive tester probe → brown/white “1”
- Negative tester probe → black/white “2”



b. Measure the ABS ECU voltage.

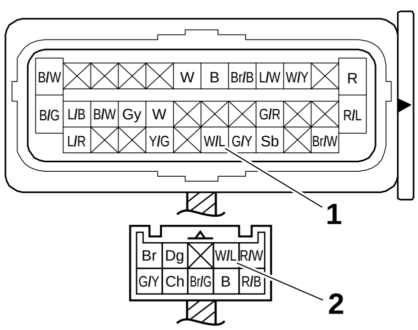
6. Check:
   - ABS-ECU-to-start-switch-lead continuity
     No continuity → Replace or repair the wire harness and front cowling wire harness.

Continuity is all right.

a. Connect the pocket tester (Ω × 1) to the ABS ECU coupler and right handlebar switch coupler.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

- Positive tester probe → white/blue “1” (ABS ECU)
- Negative tester probe → white/blue “2” (right handlebar switch)



b. Check for continuity between the ABS ECU and the start switch lead.

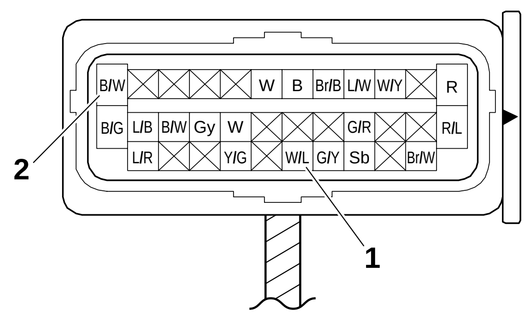
7. Check:
   - ABS ECU voltage
     Out of specification → Replace the right handlebar switch.

Start switch “ON”: less than 1 V
Start switch “OFF”: more than 12 V

a. Connect the pocket tester (DC 12 V) to the ABS ECU coupler.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

- Positive tester probe → white/blue “1”
- Negative tester probe → black/white “2”



b. Push the start switch.
c. Measure the ABS ECU voltage.

8. If the above-mentioned checks are within specification, replace the hydraulic unit assembly.

ET3P61022

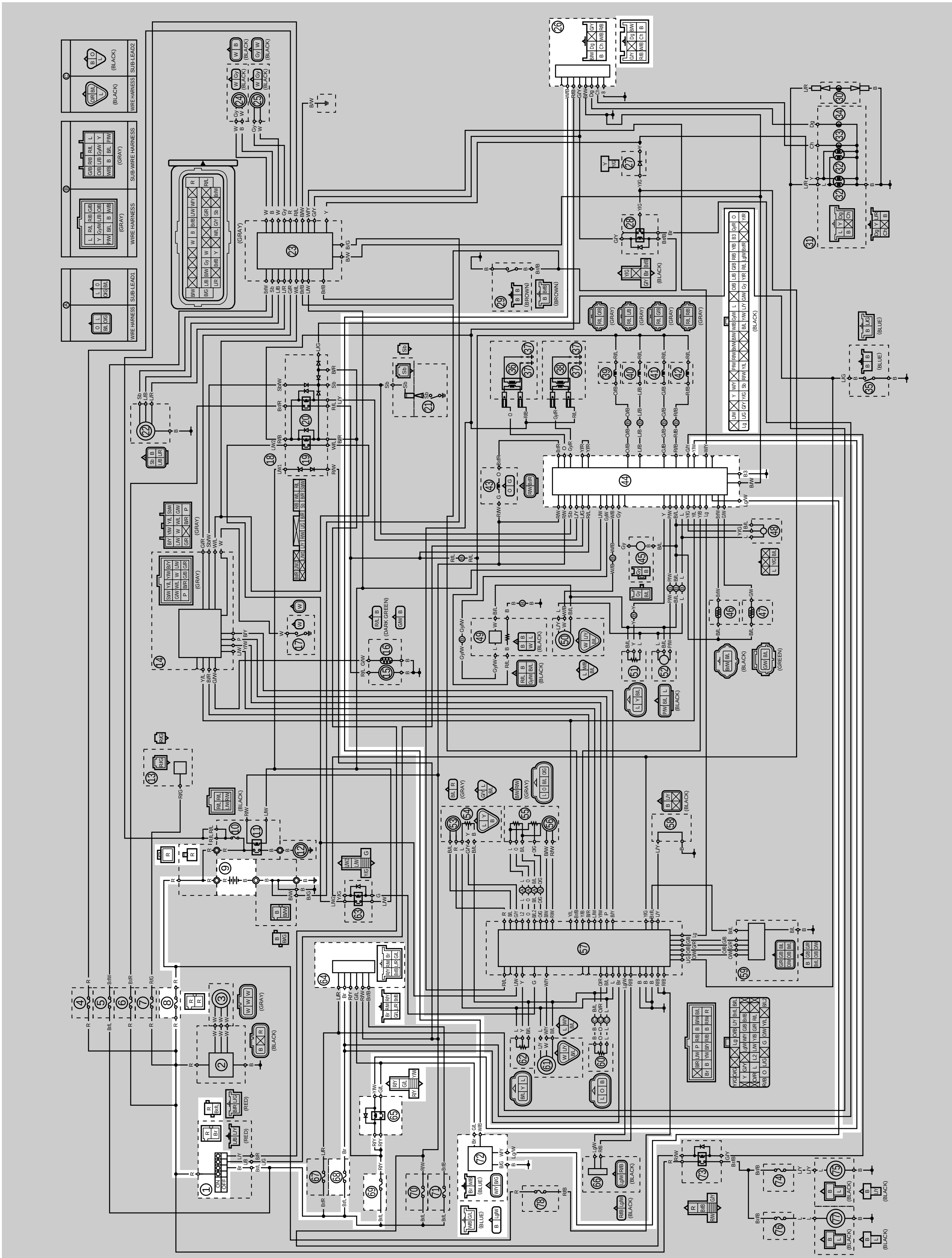
[D-3] FINAL CHECK

Checking procedures

1. Check the brake fluid level in the brake master cylinder reservoir and brake fluid reservoir.
   Refer to “CHECKING THE BRAKE FLUID LEVEL” on page 3-29.
2. Check the wheel sensor housings and wheel sensors for proper installation.
   Refer to “INSTALLING THE FRONT WHEEL (FRONT BRAKE DISCS)” on page 4-23 and “INSTALLING THE REAR WHEEL (REAR BRAKE DISC)” on page 4-30.
3. Perform hydraulic unit operation test 1 or 2.
   Refer to “HYDRAULIC UNIT OPERATION TESTS” on page 4-66.
4. Delete the fault codes.
   Refer to “[D-1] DELETING THE FAULT CODES” on page 8-167.
5. Perform a trial run.
   Refer to “TRIAL RUN” on page 4-69.

ET3P66016
GRIP WARMER SYSTEM (FJR13AE only)

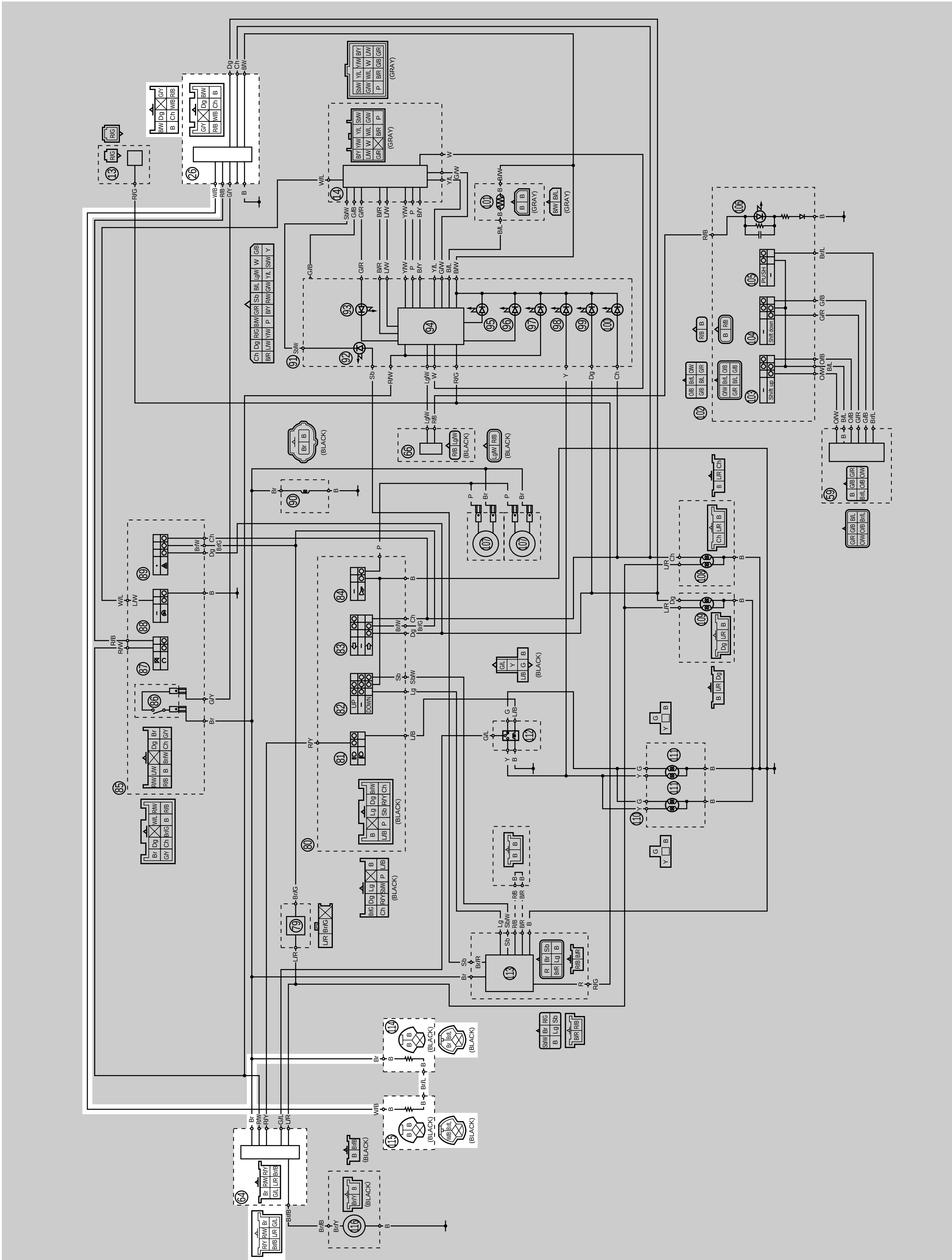
ET3P66017
CIRCUIT DIAGRAM (1/2)



1. Main switch
8. Main fuse
9. Battery
26. Coupler 3 (wire harness–front cowling wire harness)
44. ECU (engine control unit)
64. Coupler 5 (wire harness–front cowling wire harness)
65. Headlight (on/off)/grip warmer relay
68. Signaling system fuse
69. Headlight fuse
72. Grip warmer control unit

ET3P66018
CIRCUIT DIAGRAM (2/2)

Front cowling wire harness



26. Coupler 3 (wire harness–front cowling wire harness)
64. Coupler 5 (wire harness–front cowling wire harness)
114. Left grip warmer
115. Right grip warmer

ET3P66019
TROUBLESHOOTING
- The grip warmers do not become warm at all.
- The grip warmers are abnormally hot while the engine is idling.
- The grip warmers do not become very warm while the vehicle is traveling.

TIP
- Before troubleshooting, remove the following part(s):

1. Front cowling assembly

The grip warmers do not become warm at all.

Check	Result	Action
1. Check the fuses. (Main, signaling system, and headlight) Refer to “CHECKING THE FUSES” on page 8-227.	NG →	Replace the fuse(s).
OK ↓		
2. Check that the engine is started.	NG →	Start the engine.
OK ↓		
3. Check that the headlight is on.	NG →	Replace the headlight (on/off)/grip warmer relay.
OK ↓		
4. Check the grip warmers. Refer to “CHECKING THE GRIP WARMERS (FJR13AE only)” on page 8-243.	NG →	Replace the grip warmer(s).
OK ↓		
5. Check the entire grip warmer system wiring. Refer to “CIRCUIT DIAGRAM (1/2)” on page 8-169 and “CIRCUIT DIAGRAM (2/2)” on page 8-171.	NG →	Properly connect or repair the grip warmer system wiring.
OK ↓		
Replace the grip warmer control unit.		

The grip warmers are abnormally hot while the engine is idling.

Check	Result	Action
1. Check that the grip warmer adjusting knob is set to the “LO” position.	NG →	Adjust the grip warmer temperature using the grip warmer adjusting knob.
OK ↓		

Check		Action
2. Disconnect the grip warmer control unit coupler (white/yellow and black/green) and check that the temperature does not drop while the engine is running.	NG →	Replace the ECU.
OK ↓		
Replace the grip warmer control unit.		

The grip warmers do not become very warm while the vehicle is traveling.

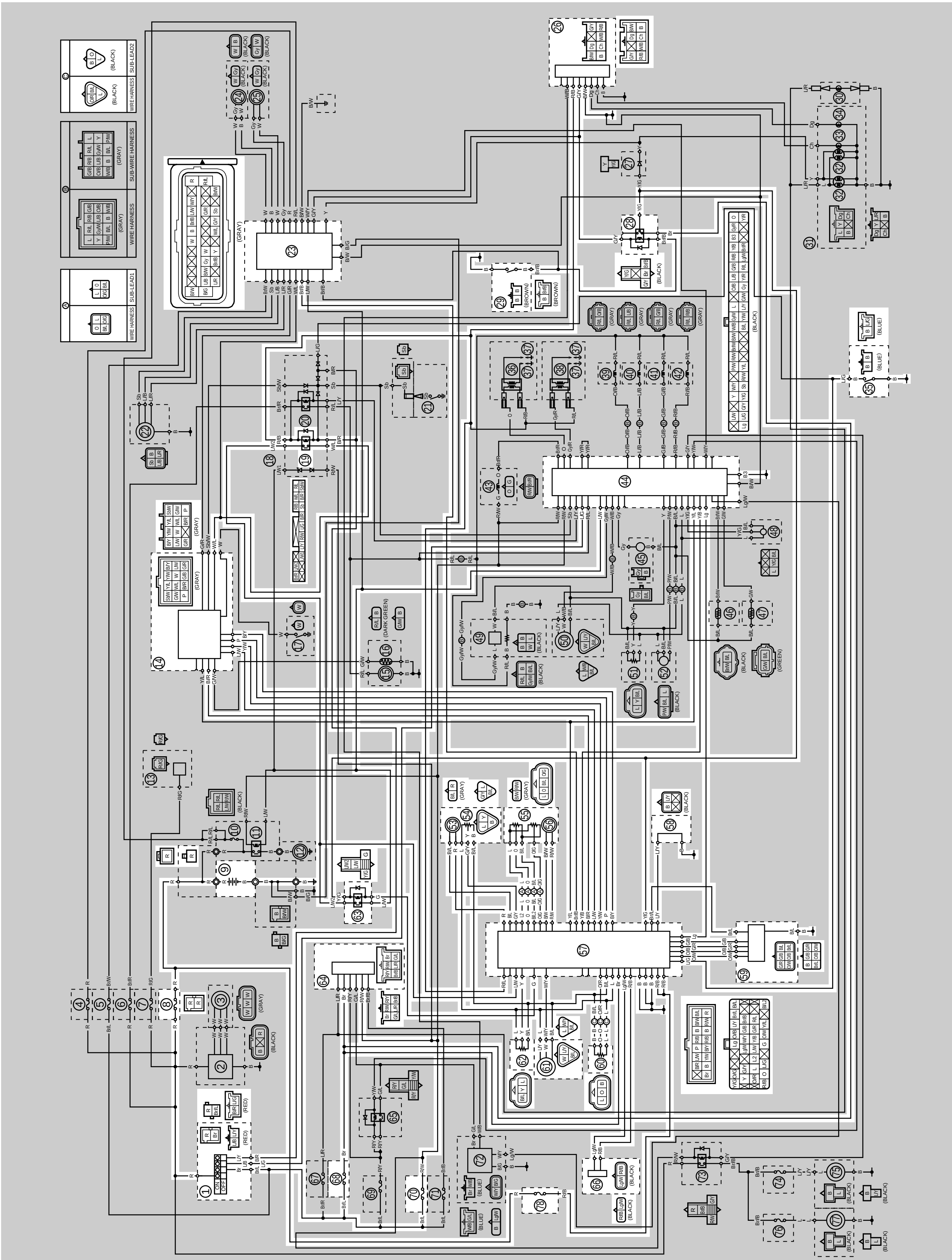
Check		Action
1. Disconnect the ECU coupler and grip warmer control unit coupler (black and light green/white) and check for continuity between the light green/white terminal of the ECU coupler and the light green/white terminal of the grip warmer control unit coupler.	NG →	The wiring system from ECU coupler to the grip warmer control unit coupler (black and light green/white) is faulty and must be repaired.
OK ↓		
2. Check that the grip warmer adjusting knob is set to the "HI" position.	NG →	Adjust the grip warmer temperature using the grip warmer adjusting knob.
OK ↓		
3. Execute the diagnostic mode (Diagnostic code No.d:57). Refer to "Actuator operation table (Diagnostic code No.d:57)".	NG →	Replace the ECU.
OK ↓		
Replace the grip warmer control unit.		

ET3P66056

YCC-S (Yamaha Chip Controlled-Shift) SYSTEM (FJR13AE only)

ET3P66057

CIRCUIT DIAGRAM (1/2)

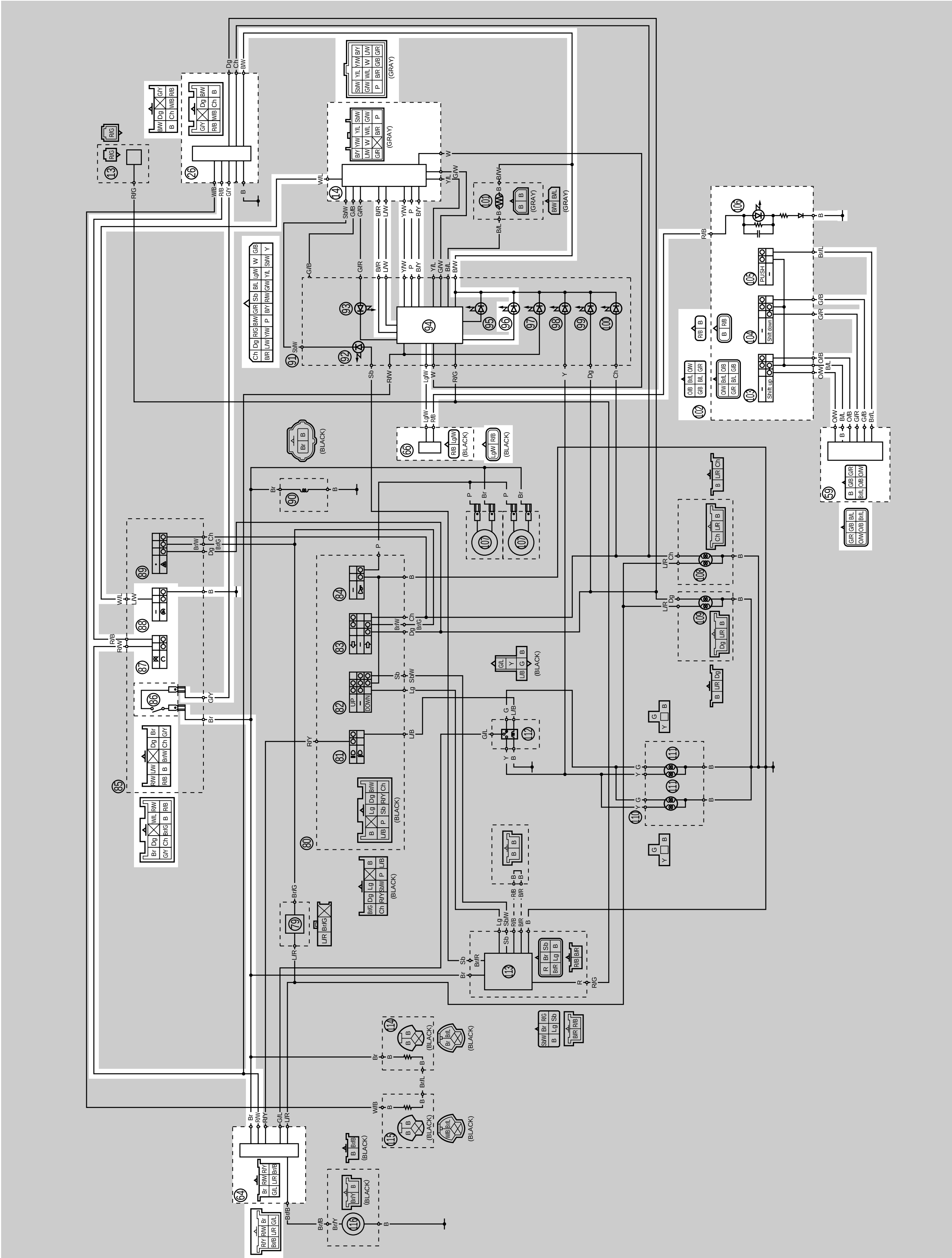


1. Main switch
8. Main fuse
9. Battery
14. Coupler 2 (wire harness–front cowling wire harness)
19. Starting circuit cut-off relay
23. ABS ECU (electronic control unit)
26. Coupler 3 (wire harness–front cowling wire harness)
28. Brake light relay
29. Rear brake light switch
35. Sidestand switch
44. ECU (engine control unit)
53. Shift actuator motor
54. Shift actuator sensor
55. Clutch actuator sensor
56. Clutch actuator motor
57. MCU (motor control unit)
58. YCC-S test coupler
59. Coupler 4 (wire harness–front cowling wire harness)
60. Foot shift switch
61. YCC-S speed sensor
62. Gear position sensor
63. YCC-S control relay
64. Coupler 5 (wire harness–front cowling wire harness)
66. Coupler 6 (wire harness–front cowling wire harness)
68. Signaling system fuse
70. Ignition fuse
78. YCC-S motor control fuse

ET3P66058

CIRCUIT DIAGRAM (2/2)

Front cowling wire harness



14. Coupler 2 (wire harness–front cowling wire harness)
26. Coupler 3 (wire harness–front cowling wire harness)
59. Coupler 4 (wire harness–front cowling wire harness)
64. Coupler 5 (wire harness–front cowling wire harness)
66. Coupler 6 (wire harness–front cowling wire harness)
86. Front brake light switch
87. Engine stop switch
88. Start switch
94. Multi-function meter
96. Engine trouble warning light
102. Hand shift switch
103. Hand shift lever switch (shift up)
104. Hand shift lever switch (shift down)
105. Hand shift select button
106. Hand shift select indicator light

ET3P66059
TROUBLESHOOTING

- The hand shift select indicator light fails to come on.
- The transmission gear display on the multi-function meter fails to indicate the selected gear.

TIP

- Before troubleshooting, remove the following part(s):

1. Front cowling assembly

Check		Action
1. Check the fuses. (Main, ignition, signaling system, and YCC-S motor fuse) Refer to "CHECKING THE FUSES" on page 8-227.	NG →	Replace the fuse(s).
OK ↓		
2. Check the battery. Refer to "CHECKING AND CHARGING THE BATTERY" on page 8-228.	NG →	• Clean the battery terminals. • Recharge or replace the battery.
OK ↓		
3. Check the main switch. Refer to "CHECKING THE SWITCHES" on page 8-221.	NG →	Replace the main switch.
OK ↓		
4. Check the entire YCC-S system wiring. Refer to "CIRCUIT DIAGRAM (1/2)" on page 8-175 and "CIRCUIT DIAGRAM (2/2)" on page 8-177.	NG →	Properly connect or repair the YCC-S system wiring.
OK ↓		
Check the condition of each of the YCC-S system circuits. Refer to "Checking the YCC-S system".		

Checking the YCC-S system

The hand shift select indicator light fails to come on.

Check		Action
1. Check the hand shift select button. Refer to "CHECKING THE SWITCHES" on page 8-221.	NG →	Replace the hand shift switch.
OK ↓		
Replace the MCU (motor control unit).		

The transmission gear display on the multi-function meter fails to indicate the selected gear.

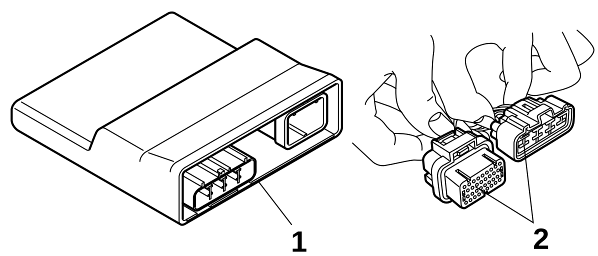
1. Check the gear position sensor. Refer to “CHECKING THE GEAR POSITION SENSOR (FJR13AE only)” on page 8-244 and “ADJUSTING THE GEAR POSITION SENSOR (FJR13AE only)” on page 5-11.	NG →	Replace the gear position sensor.
OK ↓		
2. Check the gear position setting. Refer to “Diagnostic code table (Diagnostic code No. Sh_ _65)”.	NG →	Replace the MCU (motor control unit).

ET3P66060

MAINTENANCE OF THE MCU

Checking the MCU

1. Check:
   - Terminals “1” of the MCU
     Cracks/damages → Replace the MCU.
   - Terminals “2” of the MCU couplers
     Connection defective, contaminated, come-off → Correct or clean.



TIP

If the MCU couplers are clogged with mud or dirt, clean with compressed air.

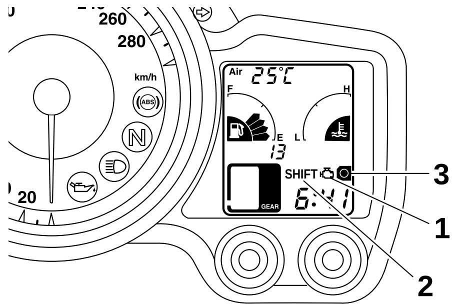
ET3P66061

MCU (motor control unit) SELF-DIAGNOSTIC FUNCTION

The MCU (motor control unit) is equipped with a self-diagnostic function in order to ensure that the YCC-S system is operating normally. If this function detects a malfunction in the YCC-S system, it immediately operates the system under substitute characteristics and lights the YCC-S indicator and warning light to alert the rider that a malfunction has occurred in the system. Once a malfunction has been detected, a fault code is stored in the memory of the MCU (motor control unit). After the engine has been stopped, the lowest fault code number appears on the odometer/tripmeter/fuel reserve tripmeter LCD. Once a fault code has been displayed, it remains stored in the memory of the MCU (motor control unit) until it is deleted.

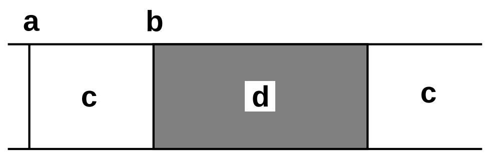
TIP

If the engine trouble indicator “1”, YCC-S indicator “2”, and engine trouble warning light “3” all come on, malfunctions have been detected in both the fuel injection system and the YCC-S system. If this occurs, the fault codes for the fuel injection system take priority over those for the YCC-S system, so only the fuel injection system fault codes will appear in the multi-function display. The fault codes for the YCC-S system will be displayed in the multi-function display after all of the fault codes for the fuel injection system have been deleted using the reinstatement method.



Checking the YCC-S indicator and warning light

The YCC-S indicator and warning light come on for 1.4 seconds after the main switch has been turned to “ON” and they come on while the start switch is being pushed. If the YCC-S indicator and warning light does not come on under these conditions, the warning light (LED) may be defective.



a. Main switch “OFF”
b. Main switch “ON”
c. YCC-S indicator and warning light off
d. YCC-S indicator and warning light on for 1.4 seconds

ET3P66062

SELF-DIAGNOSTIC FUNCTION TABLE

If the MCU (motor control unit) detects an abnormal signal from a sensor while the vehicle is being driven, the MCU (motor control unit) lights the YCC-S indicator and warning light and provides the YCC-S system with alternate operating instructions that are appropriate for the type of malfunction.
When an abnormal signal is received from a sensor, the MCU (motor control unit) processes the specified values that are programmed for each sensor in order to provide the YCC-S system with alternate operating instructions that enable the system to continue operating or stop operating, depending on the conditions.

Self-Diagnostic Function table

Fault code No.	Symptom	Malfunction detecting condition	Able/unable to start	Able/unable to change the shift
Sh_ _11	Too low or too high voltage is supplied to the YCC-S system.	Voltage is below 8 V or above 16 V.	Unable	Unable
Sh_ _12	Malfunction of power cut-off function in MCU (motor control unit)	Faulty power source relay cut-off function is detected during the YCC-S system check when main switch is turned to “ON”.	Unable	Unable

Fault code No.	Symptom	Malfunction detecting condition	Able/unable to start	Able/unable to change the shift
Sh_ _13*	Overcurrent to clutch actuator motor	Detected current in clutch actuator motor is too high.	Unable	Unable
Sh_ _14*	Overcurrent to shift actuator motor	Detected current in shift actuator motor is too high.	Unable	Unable
Sh_ _15*	Abnormal current is detected in clutch or shift actuator motor drive circuit.	Detected current in clutch actuator motor or shift actuator motor is different from MCU (motor control unit) signals.	Unable	Unable
Sh_ _16*	Malfunction of clutch or shift actuator motor drive circuit in MCU (motor control unit)	Drive circuit in MCU (motor control unit) is not working properly.	Unable	Unable
Sh_ _17*	Detected clutch actuator position is incorrect.	Detected clutch actuator position is different from MCU (motor control unit) signals.	Unable	Unable
Sh_ _18*	Detected shift actuator position is incorrect.	Detected shift actuator position is different from MCU (motor control unit) signals.	Unable	Unable
Sh_ _19*	Output signal of shift actuator sensor is abnormal.	Output signal of shift actuator sensor is below 0.5 V or above 4.5 V.	Unable	Unable
Sh_ _21	Output signal of gear position sensor is abnormal.	Output signal of gear position sensor is below 0.3 V or above 4.7 V.	Unable	Unable
Sh_ _22	Output signal of foot shift switch is abnormal.	Output signal of foot shift switch is below 0.9 V or above 4.1 V.	Able	Able
Sh_ _23	No input signal from sidestand switch.	No signal is received from sidestand switch while vehicle is driven.	Able	Able
Sh_ _25	Error has occurred in actuator drive circuit in MCU (motor control unit) when main switch is turned to “ON”.	Drive circuit error is detected during YCC-S system check when main switch is turned to “ON”.	Unable	Unable
Sh_ _26*	Abnormal clutch movement is detected during check when main switch is turned to “ON”.	Detected clutch motor current when main switch is turned to “ON” is too high.	Unable	Unable
Sh_ _27*	Diagnostic mode is activated at engine start-up.	Diagnostic mode signal is received when vehicle is started (YCC-S test coupler is connected).	Able	Able

Fault code No.	Symptom	Malfunction detecting condition	Able/unable to start	Able/unable to change the shift
Sh_ _31	Engine speed signal is abnormal.	Engine speed signal from ECU does not match multi-function meter engine speed.	Unable	Unable
Sh_ _32*	YCC-S speed sensor signal is abnormal.	YCC-S speed sensor signal does not match multi-function meter vehicle speed.	Unable	Unable
Sh_ _34	TPS (throttle position sensor) signal is abnormal.	TPS (throttle position sensor) signal voltage is too low or too high	Unable	Able
Sh_ _35	Start switch signal is abnormal.	Signal is received from start switch while vehicle is driven.	Able	Able
Sh_ _36	Output signal of clutch actuator sensor is abnormal.	Signals received from clutch actuator sensor 1 and clutch actuator sensor 2 are different or signal voltage is too low or too high.	Unable	Unable
Sh_ _37*	Power supply to clutch or shift actuator motor is abnormal.	Battery voltage is good, but motor terminal voltage is too low.	Unable	Unable
Sh_ _38	Malfunction of hand shift lever switch (shift up or shift down)	Both the on and off circuits of the hand shift lever switch (shift up or shift down) are closed at the same time.	Able	Able
Sh_ _39	Ignition timing retard output signal is abnormal.	Detected ignition retard signal from MCU (motor control unit) to ECU is abnormal.	Able	Able
Sh_ _41	Coolant temperature sensor signal is abnormal.	Coolant temperature sensor signal is too high or too low	Able	Able
Sh_ _42	Communication between ECU and multi-function meter is abnormal.	Error detected in communication signal between ECU and multi-function meter.	Unable	Able
Sh_ _43	Communication between MCU (motor control unit) and ABS ECU is abnormal.	ABS ECU continuously sends signals to activate ABS.	Able	Able
Sh_ _44*	Clutch actuator sensor signal is abnormal.	Clutch is completely engaged, but signal sent from clutch actuator sensor indicates clutch is disengaged.	Unable	Unable
Sh_ _45*	Shift operation and gear position do not match.	Gear position has not changed after shifting by shift actuator (misshift occurs repeatedly).	Unable	Unable
Sh_ _46*	Engine speed and gear position sensor signal do not match while vehicle is driven.	Gear position calculated by MCU (motor control unit) is different from foot shift switch signal.	Unable	Unable

Fault code No.	Symptom	Malfunction detecting condition	Able/un-able to start	Able/un-able to change the shift
Sh_ _47	Braking signal is not detected while braking.	No braking signal is received by MCU (motor control unit) when vehicle is braking.	Able	Able
Sh_ _48*	Improper engine idling speed adjustment.	Engine speed at engine start-up exceeds the set limit.	Unable	Unable
Sh_ _49*	Engine idling speed is too high when vehicle is started.	Engine speed when vehicle is starting off exceeds the set limit.	Able	Able
Sh_ _51	Shift actuator sensor signal is abnormal.	Shift rod is not in neutral position when shift actuator is not operating.	Unable	Unable
Sh_ _52*	Main switch signal is abnormal.	Main switch "OFF" signal is received even though engine is running.	Able	Able

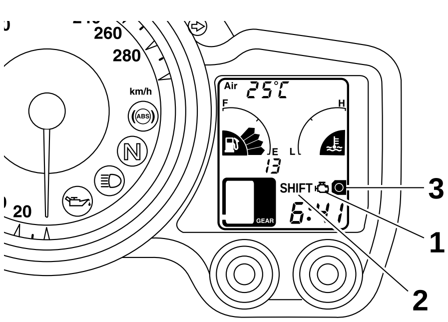
*If the main switch is turned to "OFF", the fault code number will disappear from the display and will not be displayed again when the main switch is turned back to "ON". Therefore, use the engine stop switch to stop the engine, not the main switch. If the fault code number has disappeared, activate the diagnostic mode and select diagnostic code No. Sh_ _61. The fault code numbers can be confirmed in the malfunction history. Refer to "Diagnostic code table (Diagnostic code No. Sh_ _61)".

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TROUBLESHOOTING METHOD

TIP

If the engine trouble indicator "1", YCC-S indicator "2", and engine trouble warning light "3" all come on, malfunctions have been detected in both the fuel injection system and the YCC-S system. If this occurs, the fault codes for the fuel injection system take priority over those for the YCC-S system, so only the fuel injection system fault codes will appear in the multi-function display. The fault codes for the YCC-S system will be displayed in the multi-function display after all of the fault codes for the fuel injection system have been deleted using the reinstatement method.



The YCC-S indicator and warning light come on.

1. Check:
   - Fault code number

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a. Check the fault code number displayed on the meter and diagnostic code Sh_ _61.
   Refer to "Diagnostic code table (Diagnostic code No. Sh_ _61)".
b. Identify the faulty system with the fault code.
   Refer to "Self-Diagnostic Function table".

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2. Check and repair the probable cause of the malfunction.
   Refer to "TROUBLESHOOTING DETAILS" on page 8-190.
3. Perform the reinstatement action for the YCC-system.
   Refer to "Reinstatement method" in the appropriate table in "TROUBLESHOOTING DETAILS".
4. Turn the main switch to "OFF" and back to "ON", then check that no fault code number is displayed.

TIP

If fault codes are displayed, repeat steps (1) to (4) until no fault code number is displayed.

5. Erase the malfunction history in the diagnostic mode. Refer to “Diagnostic code table (Diagnostic code No. Sh_ _62)”.

TIP

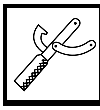
Turning the main switch to “OFF” will not erase the malfunction history.

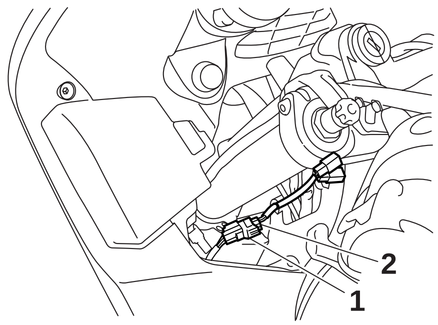
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DIAGNOSTIC MODE

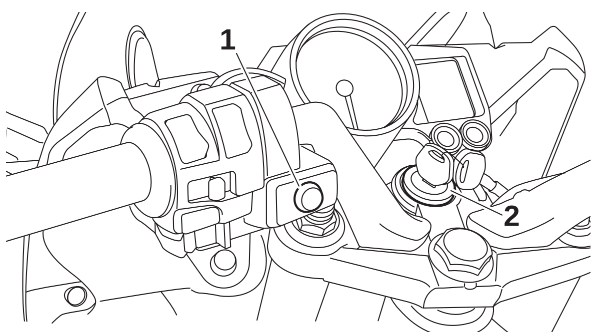
Setting the diagnostic mode

1. Turn the main switch to “OFF”.
2. Remove the front cowling left inner panel 1 to access the YCC-S test coupler “1”.
3. Remove the protective cap from the YCC-S test coupler.
4. Connect the test coupler adapter “2” to the YCC-S test coupler.

	**Test coupler adapter** **90890-03149**



5. Push and hold the hand shift select button “1”, turn the main switch “2” to “ON”, and continue to push the button for 8 seconds or more.



TIP

- All displays on the meter disappear except the odometer/tripmeter/fuel reserve tripmeter displays.
- “Sh_ _61” appears on the odometer/tripmeter/fuel reserve tripmeter LCD.

6. Select the diagnostic code number corresponding to the fault code number by pushing the hand shift select button and operating the brake lever (or brake pedal) simultaneously.
7. Turn the main switch to “OFF” to cancel the diagnostic mode.

Diagnostic code table

Diagnostic code No.	Item	Data displayed on meter (reference value)	Checking method
Sh_ _61	Malfunction history code display		
	• No history	Sh_ _61	—
	• History exists	Fault code numbers Sh_ _11–Sh_ _52 • (First displays Sh_ _61 for 6 seconds, and then displays each fault code number that is stored in the malfunction history. If more than one code number is detected, the display alternates every two seconds to show all the detected code numbers. When all of the code numbers have been shown, the display repeats the same process.)	If fault codes are stored in the malfunction history, the hand shift select indicator light will come on.

Diagnostic code No.	Item	Data displayed on meter (reference value)	Checking method
Sh_ _62	Malfunction history code erasure		
	• No history	Sh_ _62	—
	• History exists	01–09 • First displays Sh_ _62 for 6 seconds, and then displays the total number of malfunctions, including the current malfunction, that have occurred since the history was last erased. • If there are nine or more of fault codes stored in the malfunction history, “09” is displayed.	• If fault codes are stored in the malfunction history, the hand shift select indicator light will come on. To erase the history, set the engine stop switch from “⊗” to “◯”. After the history is erased, the hand shift select indicator light will go off.
Sh_ _63	Clutch actuation operation **TIP** The checking method for the diagnostic code (Sh_ _63) cannot be performed when any of the following fault codes are detected. Sh_ _11, Sh_ _12, Sh_ _13, Sh_ _15, Sh_ 16, Sh_ _17, Sh_ _25, Sh_ _26, Sh_ _36, Sh_ _37, and Sh_ _44	Sh_ _63	The clutch actuator can be operated in this mode. 1. The hand shift select indicator light comes on when the clutch is engaged. 2. Set the engine stop switch to “◯” and push the hand shift select button simultaneously. The clutch will disengage and the hand shift select indicator light will go off. 3. Set the engine stop switch to “◯” and push the hand shift select button simultaneously. The clutch will engage and the hand shift select indicator light will come on. 4. If the clutch actuator sensor is malfunctioning, the hand shift select indicator light will flash.

Diagnos-tic code No.	Item	Data displayed on meter (reference value)	Checking method
Sh_ _64	Shift actuator operation **TIP** The checking method for the diagnostic code (Sh_ _64) cannot be performed when any of the following fault codes are detected. Sh_ _11, Sh_ _12, Sh_ _14, Sh_ _15, Sh_ 16, Sh_ _18, Sh_ _19, Sh_ _25, Sh_ _37, and Sh_ _51	Sh_ _64	The shift actuator can be operated in this mode. 1. Make sure that the transmission is in neutral. 2. Set the engine stop switch to "○" and operate the hand shift lever switch (shift up) simultaneously. The MCU (motor control unit) operates the shift actuator once. The shift actuator is operated once each time two switches are operated. 3. The MCU (motor control unit) detects the signal from the shift actuator sensor. If the signal received after upshifting is correct, the hand shift select indicator light will come on. If the signal received after upshifting in incorrect, the hand shift select indicator light will flash. 4. Set the engine stop switch to "○" and operate the hand shift lever switch (shift down) simultaneously. The MCU (motor control unit) operates the shift actuator once. The shift actuator is operated once each time two switches are operated. 5. The MCU (motor control unit) detects the signal from the shift actuator sensor. If the signal received after downshifting is correct, the hand shift select indicator light will come on. If the signal received after downshifting is incorrect, the hand shift select indicator light will flash.

Diagnostic code No.	Item	Data displayed on meter (reference value)	Checking method
Sh_ _65	Gear position setting	Sh_ _65	The gear position can be set in this mode. 1. Make sure that the transmission is in neutral. 2. Push the start switch. If the gear position sensor output signal is correct for the neutral position, the hand shift select indicator light will come on for 0.5 second. 3. Shift the transmission into 1st gear using the hand shift lever switch (shift up), and then rotate the rear wheel at least 1/2 turn by hand to ensure that the dog completely engages the 1st gear. 4. Push the start switch. If the gear position sensor output signal is correct for the 1st gear position, the hand shift select indicator light will come on for 0.5 second. 5. Repeat steps 3 and 4 for each gear up to the 5th gear and make sure that the hand shift select indicator light comes on for 0.5 second each time the start switch is pushed. 6. Shift the transmission into 4th gear using the hand shift lever switch (shift down), and then rotate the rear wheel at least 1/2 turn by hand to ensure that the dog completely engages the 4th gear. 7. Push the start switch. If the gear position sensor output signal is correct for the 4th gear position, the hand shift select indicator light will come on for 0.5 second. 8. Repeat steps 6 and 7 for each gear down to the 1st gear and make sure that the hand shift select indicator light comes on for 0.5 second each time the start switch is pushed. 9. Shift the transmission into neutral. 10. After the above procedure is completed, all of the gear position data is temporarily stored and ready to be written on EEPROM. 11. Operate the brake lever or brake pedal to write the data on EEPROM. If all of the data has been written successfully on EEPROM, the hand shift select indicator light will come on for 2 seconds. If the data is not written successfully, the hand shift select indicator light will flash.

Diagnostic code No.	Item	Data displayed on meter (reference value)	Checking method
Sh_ _66	Adjust the clutch engagement position	Sh_ _66	This mode adjust the clutch engagement point manually. The clutch engagement point while the vehicle is starting off can be adjusted manually to 21 engine speed settings in this mode. The initial setting of the clutch engagement point varies according to the vehicle. • Hand shift lever switch operation (shift up) To increase the clutch engagement point by approximately 100–150 r/min, operate the hand shift lever switch (shift up) four times. After the switch is operated, the hand shift select indicator light will come on for 0.6 second. • Hand shift lever switch operation (shift down) To decrease the clutch engagement point by approximately 100–150 r/min, operate the hand shift lever switch (shift down) four times. After the switch is operated, the hand shift select indicator light will come on for 0.3 second. To write the changed setting on EEPROM, push the hand shift select button for 0.3 second. After the button is pushed, the hand shift select indicator light will come on for 2 seconds.

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TROUBLESHOOTING DETAILS

This section describes the measures per fault code number displayed on the meter. Select diagnostic code No. Sh_ _61, and then confirm the fault code numbers in the malfunction history. Check and service the items or components that are the probable cause of the malfunction following the order given. After the check and service of the malfunctioning part has been completed, reset the meter display according to the reinstatement method. Then select diagnostic code No. Sh_ _62 in the diagnostic mode to erase the malfunction history.
Fault code No.:
Code number displayed on the meter when the engine failed to work normally. Refer to “Self-Diagnostic Function table”.

Fault code No.	**Sh_ _11**	**Symptom**	**Too low or too high voltage is supplied to the YCC-S system.**
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Connections • Wire harness MCU (motor control unit) coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Repairing the cause of the malfunction.
2	Faulty battery	• Replace or charge the battery. Refer to “CHECKING AND CHARGING THE BATTERY” on page 8-228.	
3	Malfunction in rectifier/regulator	• Replace if detective. Refer to “CHARGING SYSTEM” on page 8-29.	
4	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between battery and main switch coupler. (red–red) • Between main switch coupler and signaling system fuse. (brown/blue–brown/blue) • Between signaling system fuse and MCU (motor control unit) coupler. (brown–brown)	

Fault code No.	**Sh_ _12**	**Symptom**	**Malfunction of power cut-off function in the MCU (motor control unit).**
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Malfunction in MCU (motor control unit).	Replace the MCU (motor control unit).	Repairing the cause of the malfunction.

Fault code No.	Sh_ _13	Symptom	Over current to clutch actuator motor.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Connections • Wire harness MCU (motor control unit) coupler • Clutch actuator motor coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning the main switch to “OFF”. See NOTE.
2	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between clutch actuator motor coupler and MCU (motor control unit) coupler. (black/white–black/white) (red/white–red/white) • Between battery and YCC-S motor control fuse terminal. (red–red) • Between YCC-S motor control fuse and MCU (motor control unit). (red/black–red/black)	
3	YCC-S motor control fuse	• Replace if defective.	
4	Stuck clutch actuator motor.	• Replace the clutch actuator.	

TIP

If the main switch is turned to “OFF”, the fault code number will disappear from the display and will not be displayed again when the main switch is turned back to “ON”. Therefore, use the engine stop switch to stop the engine, not the main switch. If the fault code number has disappeared, activate the diagnostic mode and select diagnostic code No. Sh_ _61. The fault code numbers can be confirmed in the malfunction history.

<table>
<tr><td colspan="2">Fault code No. | Sh_ _14 | Symptom</td><td colspan="2">Over current to shift actuator motor.</td></tr>
<tr><td>Order</td><td>Item/components and probable cause</td><td>Check or maintenance job</td><td>Reinstatement method</td></tr>
<tr><td>1</td><td>• Connections
• Wire harness MCU (motor control unit) coupler
• Shift actuator motor coupler</td><td>• Check the coupler for any pins that may be pulled out.
• Check the locking condition of the coupler.
• If there is a malfunction, repair it and connect the coupler securely.</td><td rowspan="4">Turning the main switch to “OFF”.
See NOTE.</td></tr>
<tr><td>2</td><td>Open or short circuit in wire harness.</td><td>• Repair or replace if there is an open or short circuit.
• Between shift actuator motor coupler and MCU (motor control unit) coupler.
(black/blue–black/blue)
(red–red)
• Between battery and YCC-S motor control fuse terminal.
(red–red)
• Between YCC-S motor control fuse and MCU (motor control unit).
(red/black–red/black)</td></tr>
<tr><td>3</td><td>YCC-S motor control fuse</td><td>• Replace if defective.</td></tr>
<tr><td>4</td><td>Stuck shift actuator motor.</td><td>• Replace the shift actuator.</td></tr>
</table>

TIP

If the main switch is turned to “OFF”, the fault code number will disappear from the display and will not be displayed again when the main switch is turned back to “ON”. Therefore, use the engine stop switch to stop the engine, not the main switch. If the fault code number has disappeared, activate the diagnostic mode and select diagnostic code No. Sh_ _61. The fault code numbers can be confirmed in the malfunction history.

Fault code No.	Sh_ _15	Symptom	Abnormal current is detected in clutch or shift actuator motor drive circuit.

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections • Wire harness MCU (motor control unit) coupler • Clutch actuator motor coupler • Shift actuator motor coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning the main switch to "OFF". See NOTE.
2	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between clutch actuator motor coupler and MCU (motor control unit) coupler. (black/white–black/white) (red/white–red/white) • Between shift actuator motor coupler and MCU (motor control unit) coupler. (black/blue–black/blue) (red–red) • Between battery and YCC-S motor control fuse terminal. (red–red) • Between YCC-S motor control fuse and MCU (motor control unit). (red/black–red/black)	
3	YCC-S motor control fuse	• Replace if defective.	
4	Defective clutch or shift actuator motor drive circuit.	• Replace the clutch actuator or shift actuator.	
5	Confirm the operation of the main switch after repairing the malfunction or correcting the cause.	• Execute the diagnostic mode. (Code No. Sh_ _63 and Sh_ _64)	

TIP

If the main switch is turned to "OFF", the fault code number will disappear from the display and will not be displayed again when the main switch is turned back to "ON". Therefore, use the engine stop switch to stop the engine, not the main switch. If the fault code number has disappeared, activate the diagnostic mode and select diagnostic code No. Sh_ _61. The fault code numbers can be confirmed in the malfunction history.

Fault code No.	**Sh_ _16**	**Symptom**	**Malfunction of clutch or shift actuator motor drive circuit in the MCU (motor control unit).**
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Connections • Wire harness MCU (motor control unit) coupler • Clutch actuator motor coupler • Shift actuator motor coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning the main switch to "OFF". See NOTE.
2	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between clutch actuator motor coupler and MCU (motor control unit) coupler. (black/white–black/white) (red/white–red/white) • Between shift actuator motor coupler and MCU (motor control unit) coupler. (black/blue–black/blue) (red–red)	
3	Malfunction in MCU (motor control unit).	Replace the MCU (motor control unit).	

TIP

If the main switch is turned to "OFF", the fault code number will disappear from the display and will not be displayed again when the main switch is turned back to "ON". Therefore, use the engine stop switch to stop the engine, not the main switch. If the fault code number has disappeared, activate the diagnostic mode and select diagnostic code No. Sh_ _61. The fault code numbers can be confirmed in the malfunction history.

Fault code No.	Sh_ _17	Symptom	Detected clutch actuator position is incorrect.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Connections • Wire harness MCU (motor control unit) coupler • Clutch actuator motor coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning the main switch to “OFF”. See NOTE.
2	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between clutch actuator motor coupler and MCU (motor control unit) coupler. (black/white–black/white) (red/white–red/white)	
3	Stuck clutch actuator motor or clutch actuator gear	• Replace the clutch actuator.	
4	Confirm the operation of the main switch after repairing the malfunction or correcting the cause.	• Execute the diagnostic mode. (Code No. Sh_ _63)	

TIP

If the main switch is turned to “OFF”, the fault code number will disappear from the display and will not be displayed again when the main switch is turned back to “ON”. Therefore, use the engine stop switch to stop the engine, not the main switch. If the fault code number has disappeared, activate the diagnostic mode and select diagnostic code No. Sh_ _61. The fault code numbers can be confirmed in the malfunction history.

Fault code No.	Sh_ _18	Symptom	Detected shift actuator position is incorrect.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Connections • Wire harness MCU (motor control unit) coupler • Shift actuator motor coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning the main switch to "OFF". See NOTE.
2	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between shift actuator motor coupler and MCU (motor control unit) coupler. (black/blue–black/blue) (red–red)	
3	Stuck shift actuator motor or shift actuator gear	• Replace the shift actuator.	
4	Confirm the operation of the main switch after repairing the malfunction or correcting the cause.	• Execute the diagnostic mode. (Code No. Sh_ _64)	

TIP

If the main switch is turned to "OFF", the fault code number will disappear from the display and will not be displayed again when the main switch is turned back to "ON". Therefore, use the engine stop switch to stop the engine, not the main switch. If the fault code number has disappeared, activate the diagnostic mode and select diagnostic code No. Sh_ _61. The fault code numbers can be confirmed in the malfunction history.

Fault code No.	Sh_ _19	Symptom	Output signal of shift actuator sensor is abnormal.

Order	Item/components and probable cause	Check or maintenance job	Reinstatement method
1	Connections • Wire harness MCU (motor control unit) coupler • Shift actuator sensor coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning the main switch to “OFF”. See NOTE.
2	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between shift actuator sensor coupler and MCU (motor control unit) coupler. (green/yellow–green/yellow) (blue–blue) (black/blue–black/blue)	
3	Defective shift actuator sensor.	• Replace the shift actuator.	

TIP

If the main switch is turned to “OFF”, the fault code number will disappear from the display and will not be displayed again when the main switch is turned back to “ON”. Therefore, use the engine stop switch to stop the engine, not the main switch. If the fault code number has disappeared, activate the diagnostic mode and select diagnostic code No. Sh_ _61. The fault code numbers can be confirmed in the malfunction history.

Fault code No.	Sh_ _21	Symptom	Output signal of gear position sensor is abnormal.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Connections • Wire harness MCU (motor control unit) coupler • Gear position sensor coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Repairing the cause of the malfunction.
2	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between gear position sensor coupler and MCU (motor control unit) coupler. (yellow–yellow) (blue–blue) (black/blue–black/blue)	
3	Defective gear position sensor.	• Adjust or replace if defective. Refer to “ADJUSTING THE GEAR POSITION SENSOR (FJR13AE only)” on page 5-11 and “CHECKING THE GEAR POSITION SENSOR (FJR13AE only)” on page 8-244.	
4	Gear position setting	• Execute the diagnostic mode. (Code No. Sh_ _65)	

Fault code No.	**Sh_ _22**	**Symptom**	**Output signal of foot shift switch is abnormal.**
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Connections • Wire harness MCU (motor control unit) coupler • Foot shift switch coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Repairing the cause of the malfunction.
2	Open or short circuit in wire harness and/or sub-lead 2.	• Repair or replace if there is an open or short circuit. • Between foot shift switch coupler and MCU (motor control unit) coupler. (orange/red–orange) (blue–blue) (black–black/blue)	
3	Defective foot shift switch.	• Adjust or replace if defective. Refer to “ADJUSTING THE FOOT SHIFT SWITCH” on page 5-76 and “CHECKING THE FOOT SHIFT SWITCH (FJR13AE only)” on page 8-245.	

Fault code No.	**Sh_ _23**	**Symptom**	**No input signal from sidestand switch.**
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Connections • Wire harness MCU (motor control unit) coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Repairing the cause of the malfunction.
2	Open circuit in wire harness.	• Repair or replace if there is an open circuit. • Between sidestand switch coupler and MCU (motor control unit) coupler. (blue/green–blue/green)	
3	Defective sidestand switch.	• Check and replace if defective. Refer to “CHECKING THE SWITCHES” on page 8-221.	

Fault code No.	**Sh_ _25**	**Symptom**	**Error has occurred in the actuator drive circuit in MCU (motor control unit) when main switch is turned to "ON".**
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Malfunction in MCU (motor control unit).	Replace the MCU (motor control unit).	Replacing the MCU (motor control unit).

Fault code No.	**Sh_ _26**	**Symptom**	**Abnormal clutch movement is detected during check when main switch is turned to "ON".**
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Clutch fluid	• Check for clutch fluid leakage. • Check the clutch fluid level. Refer to "CHECKING THE CLUTCH FLUID LEVEL (FJR13AE)" on page 3-18.	Turning the main switch to "OFF". See NOTE.
2	Air in hydraulic clutch system	• Check the clutch stroke. • Bleed the hydraulic clutch. Refer to "BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)" on page 3-19.	

TIP

If the main switch is turned to "OFF", the fault code number will disappear from the display and will not be displayed again when the main switch is turned back to "ON". Therefore, use the engine stop switch to stop the engine, not the main switch. If the fault code number has disappeared, activate the diagnostic mode and select diagnostic code No. Sh_ _61. The fault code numbers can be confirmed in the malfunction history.

<table>
<tr><td colspan="2">Fault code No.</td><td>Sh_ _27</td><td>Symptom</td><td colspan="2">Diagnosis mode is activated at engine start-up.</td></tr>
<tr><td>Order</td><td colspan="3">Item/components and probable cause</td><td>Check or maintenance job</td><td>Reinstatement method</td></tr>
<tr><td>1</td><td colspan="3">YCC-S test coupler</td><td>• Check that the test coupler adapter is not connected.
Refer to “DIAGNOSTIC MODE” on page 8-185.</td><td rowspan="2">Turning the main switch to “OFF”.
See NOTE.</td></tr>
<tr><td>2</td><td colspan="3">Short circuit in wire harness.</td><td>• Repair or replace if there is a short circuit.
• Between YCC-S test coupler and MCU (motor control unit) coupler.
(blue/yellow–blue/yellow)</td></tr>
</table>

TIP

If the main switch is turned to “OFF”, the fault code number will disappear from the display and will not be displayed again when the main switch is turned back to “ON”. Therefore, use the engine stop switch to stop the engine, not the main switch. If the fault code number has disappeared, activate the diagnostic mode and select diagnostic code No. Sh_ _61. The fault code numbers can be confirmed in the malfunction history.

<table>
<tr><td colspan="2">Fault code No.</td><td>Sh_ _31</td><td>Symptom</td><td colspan="2">Engine speed signal is abnormal.</td></tr>
<tr><td>Order</td><td colspan="3">Item/components and probable cause</td><td>Check or maintenance job</td><td>Reinstatement method</td></tr>
<tr><td>1</td><td colspan="3">Connections
• Wire harness MCU (motor control unit) coupler
• Wire harness ECU coupler</td><td>• Check the coupler for any pins that may be pulled out.
• Check the locking condition of the coupler.
• If there is a malfunction, repair it and connect the coupler securely.</td><td rowspan="2">Repairing the cause of the malfunction.</td></tr>
<tr><td>2</td><td colspan="3">Open or short circuit in wire harness.</td><td>• Repair or replace if there is an open or short circuit.
• Between ECU coupler and MCU (motor control unit) coupler.
(yellow/black–yellow/black)</td></tr>
</table>

Fault code No.	Sh_ _32	Symptom	YCC-S speed sensor signal is abnormal.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Connections • Wire harness MCU (motor control unit) coupler • YCC-S speed sensor coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning the main switch to "OFF". See NOTE.
2	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between YCC-S speed sensor coupler and MCU (motor control unit) coupler. (white/yellow–white/yellow) (blue–blue) (black/blue–black/blue)	
3	Defective YCC-S speed sensor.	• Replace if detective. Refer to "CHECKING THE YCC-S SPEED SENSOR (FJR13AE only)" on page 8-244.	

TIP

If the main switch is turned to "OFF", the fault code number will disappear from the display and will not be displayed again when the main switch is turned back to "ON". Therefore, use the engine stop switch to stop the engine, not the main switch. If the fault code number has disappeared, activate the diagnostic mode and select diagnostic code No. Sh_ _61. The fault code numbers can be confirmed in the malfunction history.

Fault code No.	Sh_ _34	Symptom	TPS (throttle position sensor) signal is abnormal.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Connections • Wire harness MCU (motor control unit) coupler • Wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Repairing the cause of the malfunction.
2	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between ECU coupler and MCU (motor control unit) coupler. (yellow/blue–yellow/blue)	

Fault code No.	Sh_ _35	Symptom	Start switch signal is abnormal.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Connections • Wire harness MCU (motor control unit) coupler • Relay unit coupler • Right handlebar switch coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Repairing the cause of the malfunction.
2	Open or short circuit in wire harness and/or front cowling wire harness.	• Repair or replace if there is an open or short circuit. • Between right handlebar switch coupler and relay unit coupler. (white/blue–white/blue) • Between relay unit coupler and MCU (motor control unit) coupler. (blue/white–blue/white)	
3	Defective relay unit.	• Check and replace relay unit. Refer to “CHECKING THE RELAYS” on page 8-231.	
4	Defective start switch.	• Check and replace right handlebar switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	

Fault code No.	Sh_ _36	Symptom	Output signal of clutch actuator sensor is abnormal.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Connections • Wire harness MCU (motor control unit) coupler • Clutch actuator sensor coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Repairing the cause of the malfunction.
2	Open or short circuit in wire harness and/or sub-lead 1.	• Repair or replace if there is an open or short circuit. • Between clutch actuator sensor coupler and MCU (motor control unit) coupler. (orange–orange) (orange/green–orange/green) (blue–blue) (black/blue–black/blue)	
3	Defective clutch actuator sensor.	• Replace clutch actuator.	

Fault code No.	**Sh_ _37**	**Symptom**	**Power supply to clutch or shift actuator motor is abnormal.**

Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Connections • Wire harness MCU (motor control unit) coupler • Clutch actuator motor coupler • Shift actuator motor coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning the main switch to “OFF”. See NOTE.
2	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between clutch actuator motor coupler and MCU (motor control unit) coupler. (black/white–black/white) (red/white–red/white) • Between shift actuator motor coupler and MCU (motor control unit) coupler. (black/blue–black/blue) (red–red)	
3	Defective clutch or shift actuator motor.	• Replace the clutch actuator or shift actuator.	

TIP

If the main switch is turned to “OFF”, the fault code number will disappear from the display and will not be displayed again when the main switch is turned back to “ON”. Therefore, use the engine stop switch to stop the engine, not the main switch. If the fault code number has disappeared, activate the diagnostic mode and select diagnostic code No. Sh_ _61. The fault code numbers can be confirmed in the malfunction history.

Fault code No.	**Sh_ _38**	**Symptom**	**Malfunction of hand shift lever switch (shift up or shift down).**
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Connections • Wire harness MCU (motor control unit) coupler • Hand shift switch coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Repairing the cause of the malfunction.
2	Open or short circuit in wire harness and/or front cowling wire harness.	• Repair or replace if there is an open or short circuit. • Between hand shift switch coupler and MCU (motor control unit) coupler. (orange/white–orange/white) (orange/black–orange/black) (green/red–green/red) (green/black–green/black)	
3	Defective hand shift lever switch (shift up or shift down).	• Replace hand shift switch. Refer to “CHECKING THE SWITCHES” on page 8-221.	

Fault code No.	**Sh_ _39**	**Symptom**	**Ignition timing retard output signal is abnormal.**
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Connections • Wire harness MCU (motor control unit) coupler • Wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Repairing the cause of the malfunction.
2	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between ECU coupler and MCU (motor control unit) coupler. (light green–light green)	

Fault code No.	Sh_ _41	Symptom	Coolant temperature sensor signal is abnormal.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Connections • Wire harness MCU (motor control unit) coupler • Wire harness ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Repairing the cause of the malfunction.
2	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between ECU coupler and MCU (motor control unit) coupler. (yellow/blue–yellow/blue)	

Fault code No.	Sh_ _42	Symptom	Communication between ECU and multi-function meter is abnormal.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Connections • Wire harness MCU (motor control unit) coupler • YCC-S speed sensor coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Repairing the cause of the malfunction.
2	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between YCC-S speed sensor coupler and MCU (motor control unit) coupler. (yellow/blue–yellow/blue)	

Fault code No.	Sh_ _43	Symptom	Communication between MCU (motor control unit) and ABS ECU is abnormal.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Connections • Wire harness MCU (motor control unit) coupler • ABS ECU coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Repairing the cause of the malfunction.
2	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between ABS ECU coupler and MCU (motor control unit) coupler. (brown/black–brown/black)	

Fault code No.	Sh_ _44	Symptom	Clutch actuator sensor signal is abnormal.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Defective clutch actuator sensor.	• Replace clutch actuator.	Turning the main switch to “OFF”. See NOTE.
2	Confirm the operation of the main switch after repairing the malfunction or correcting the cause.	• Execute the diagnostic mode. (Code No. Sh_ _63)	

TIP

If the main switch is turned to “OFF”, the fault code number will disappear from the display and will not be displayed again when the main switch is turned back to “ON”. Therefore, use the engine stop switch to stop the engine, not the main switch. If the fault code number has disappeared, activate the diagnostic mode and select diagnostic code No. Sh_ _61. The fault code numbers can be confirmed in the malfunction history.

Fault code No.		Sh_ _45	Symptom	Shift operation and gear position do not match.	
Order	**Item/components and probable cause**			**Check or maintenance job**	**Reinstatement method**
1	Shift rod			• Check the shift rod pin hole location. • Check the shift rod groove location. • Adjust or replace if defective. Refer to “CHECKING THE SHIFT ROD” on page 5-75 and “INSTALLING THE SHIFT ACTUATOR” on page 5-77.	Turning the main switch to “OFF”. See NOTE.
2	Defective shift actuator.			• Replace shift actuator.	
3	Confirm the operation of the main switch after repairing the malfunction or correcting the cause.			• Execute the diagnostic mode. (Code No. Sh_ _64)	

TIP

If the main switch is turned to “OFF”, the fault code number will disappear from the display and will not be displayed again when the main switch is turned back to “ON”. Therefore, use the engine stop switch to stop the engine, not the main switch. If the fault code number has disappeared, activate the diagnostic mode and select diagnostic code No. Sh_ _61. The fault code numbers can be confirmed in the malfunction history.

Fault code No.		Sh_ _46	Symptom	Engine speed and gear position sensor signal do not match while vehicle is driven.	
Order	**Item/components and probable cause**			**Check or maintenance job**	**Reinstatement method**
1	Gear position setting.			• Execute the diagnostic mode. (Code No. Sh_ _65)	Turning the main switch to “OFF”. See NOTE.

TIP

If the main switch is turned to “OFF”, the fault code number will disappear from the display and will not be displayed again when the main switch is turned back to “ON”. Therefore, use the engine stop switch to stop the engine, not the main switch. If the fault code number has disappeared, activate the diagnostic mode and select diagnostic code No. Sh_ _61. The fault code numbers can be confirmed in the malfunction history.

Fault code No.	Sh_ _47	Symptom	Braking signal is not detected while braking.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Connections • Wire harness MCU (motor control unit) coupler • Brake light relay coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Repairing the cause of the malfunction.
2	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between battery and main switch coupler. (red–red) • Between main switch coupler and signaling system fuse. (brown/blue–brown/blue) • Between signaling system fuse and brake light relay coupler. (brown–brown) • Between brake light relay coupler and MCU (motor control unit) coupler. (yellow/green–yellow/green)	
3	Defective brake light relay.	• Replace if defective. Refer to “CHECKING THE RELAYS” on page 8-231.	

Fault code No.	Sh_ _48	Symptom	Improper engine idling speed adjustment.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Engine idling speed	• Check and adjust the engine idling speed. Refer to “ADJUSTING THE ENGINE IDLING SPEED” on page 3-10.	Turning the main switch to “OFF”. See NOTE.
2	Defective fast idle unit.	• Replace the throttle bodies. Refer to “THROTTLE BODIES” on page 7-5.	

TIP

If the main switch is turned to “OFF”, the fault code number will disappear from the display and will not be displayed again when the main switch is turned back to “ON”. Therefore, use the engine stop switch to stop the engine, not the main switch. If the fault code number has disappeared, activate the diagnostic mode and select diagnostic code No. Sh_ _61. The fault code numbers can be confirmed in the malfunction history.

Fault code No.	Sh_ _49	Symptom	Engine idling speed is too high when vehicle is started.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Clutch operation.	• Check the clutch stroke. Refer to “BLEEDING THE HYDRAULIC CLUTCH SYSTEM (FJR13AE)” on page 3-19.	Turning the main switch to “OFF”. See NOTE.
2	Clutch slippage.	• Check the friction plate thickness and replace the friction plates if necessary. Refer to “CHECKING THE FRICTION PLATES” on page 5-61.	

TIP

If the main switch is turned to “OFF”, the fault code number will disappear from the display and will not be displayed again when the main switch is turned back to “ON”. Therefore, use the engine stop switch to stop the engine, not the main switch. If the fault code number has disappeared, activate the diagnostic mode and select diagnostic code No. Sh_ _61. The fault code numbers can be confirmed in the malfunction history.

Fault code No.	Sh_ _51	Symptom	Shift actuator sensor signal is abnormal.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Shift rod	• Check the shift rod pin hole location. • Check the shift rod groove location. • Adjust or replace the shift rod. Refer to “CHECKING THE SHIFT ROD” on page 5-75 and “INSTALLING THE SHIFT ACTUATOR” on page 5-77.	Repairing the cause of the malfunction.
2	Defective shift actuator sensor.	• Replace the shift actuator.	
3	Confirm the operation of the main switch after repairing the malfunction or correcting the cause.	• Execute the diagnostic mode. (Code No. Sh_ _64)	

Fault code No.	Sh_ _52	Symptom	Main switch signal is abnormal.
Order	**Item/components and probable cause**	**Check or maintenance job**	**Reinstatement method**
1	Connections • Wire harness MCU (motor control unit) coupler	• Check the coupler for any pins that may be pulled out. • Check the locking condition of the coupler. • If there is a malfunction, repair it and connect the coupler securely.	Turning the main switch to “OFF”. See NOTE.
2	Open or short circuit in wire harness.	• Repair or replace if there is an open or short circuit. • Between battery and main switch coupler. (red–red) • Between main switch coupler and signaling system fuse. (brown/blue–brown/blue) • Between signaling system fuse and MCU (motor control unit) coupler. (brown–brown)	

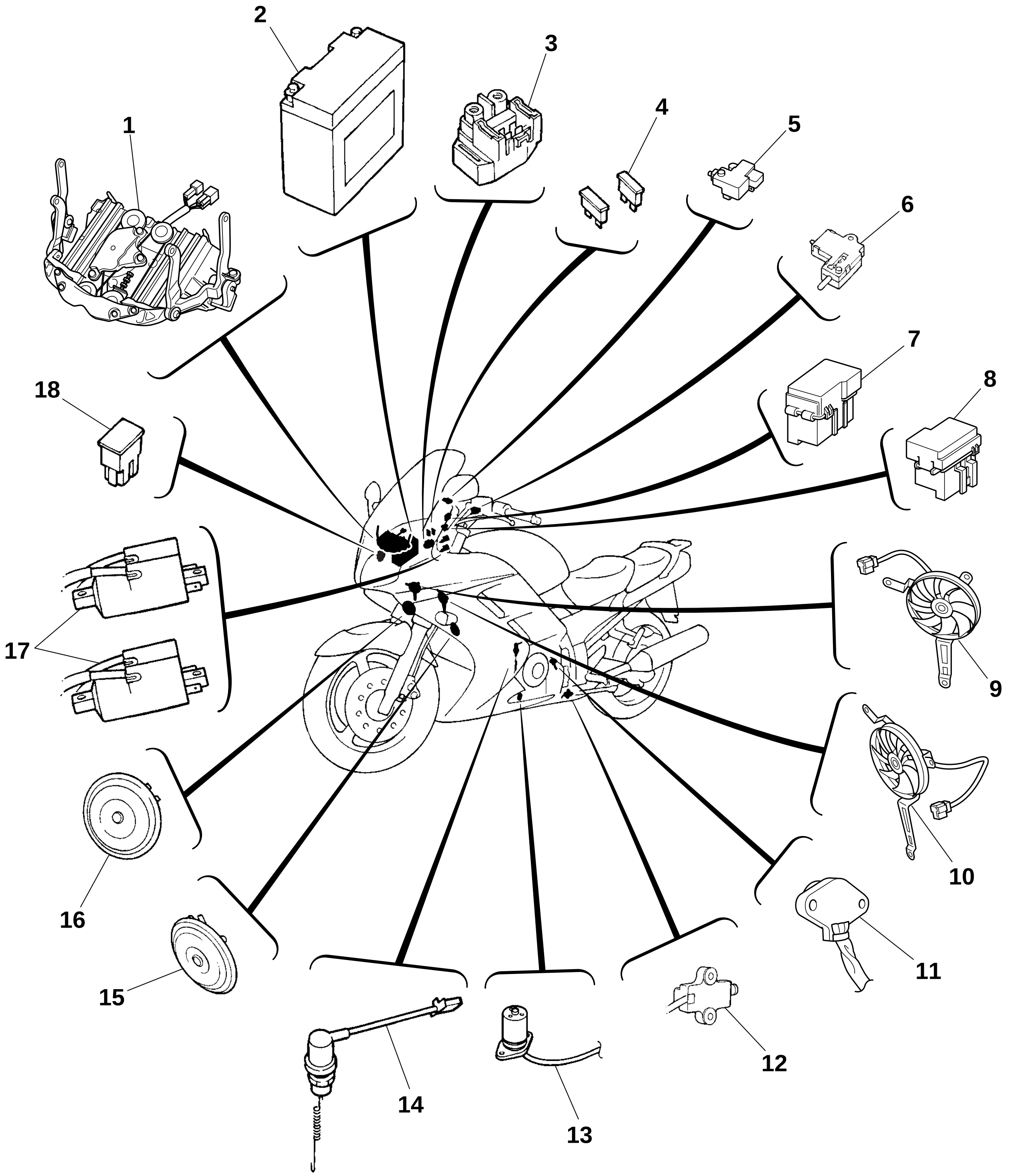
TIP

If the main switch is turned to “OFF”, the fault code number will disappear from the display and will not be displayed again when the main switch is turned back to “ON”. Therefore, use the engine stop switch to stop the engine, not the main switch. If the fault code number has disappeared, activate the diagnostic mode and select diagnostic code No. Sh_ _61. The fault code numbers can be confirmed in the malfunction history.

EAS27970

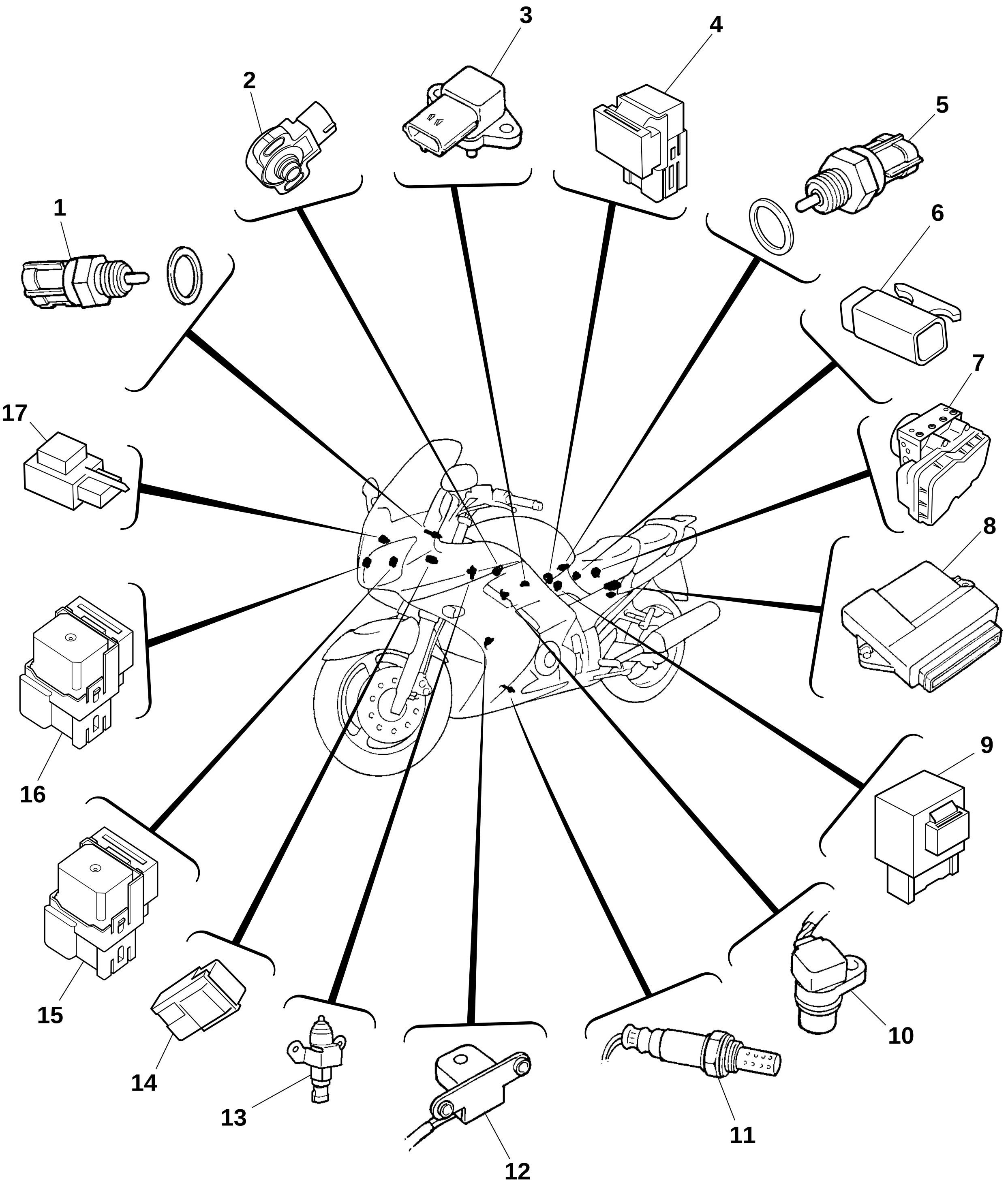
ELECTRICAL COMPONENTS

FJR13A



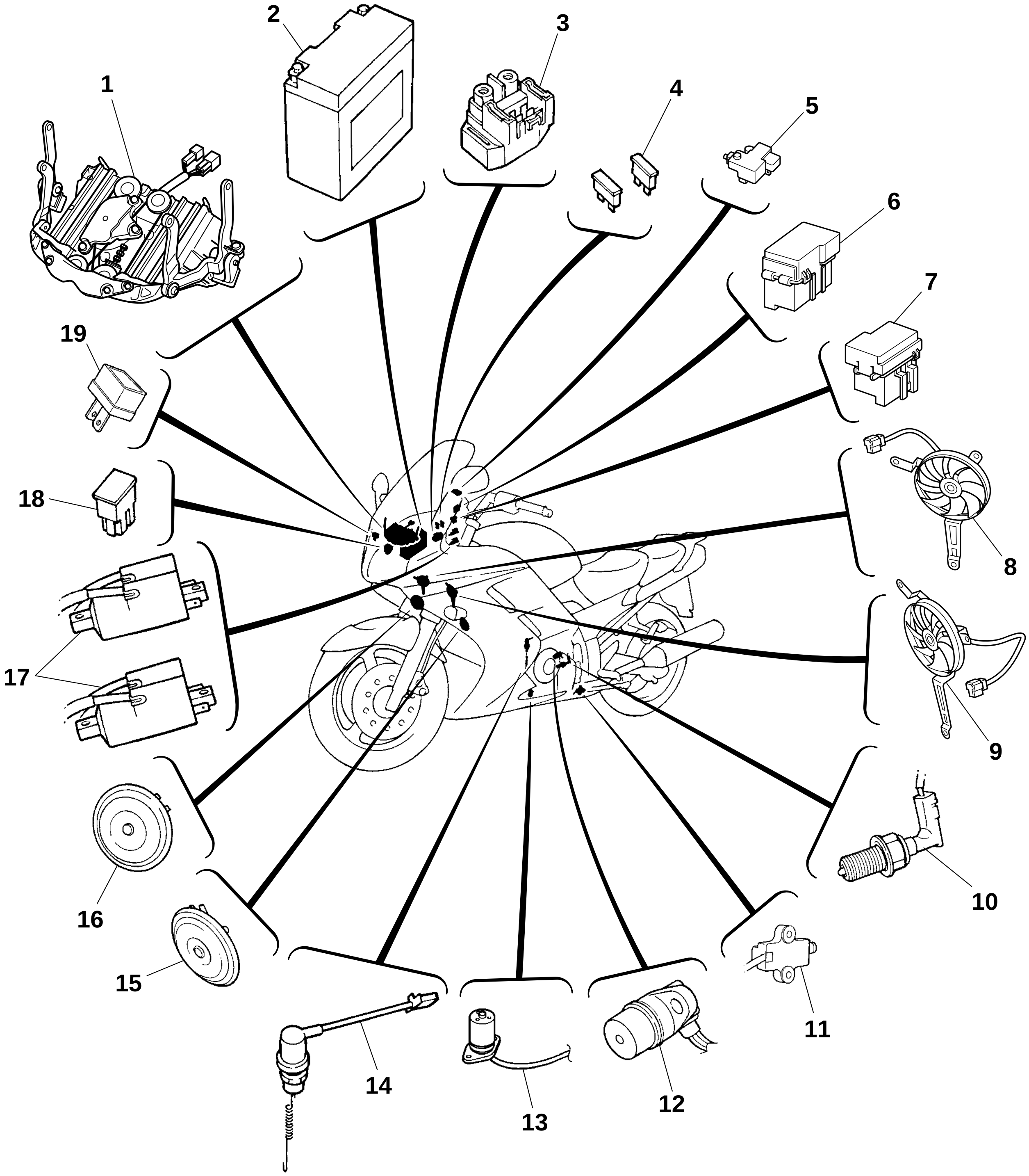
1. Windshield drive unit
2. Battery
3. Starter relay
4. ABS motor fuse
5. Front brake light switch
6. Clutch switch
7. Fuse box 2
8. Fuse box 1
9. Right radiator fan motor
10. Left radiator fan motor
11. Gear position switch
12. Sidestand switch
13. Oil level switch
14. Rear brake light switch
15. Left horn (low)
16. Right horn (high)
17. Ignition coil
18. Main fuse

FJR13A



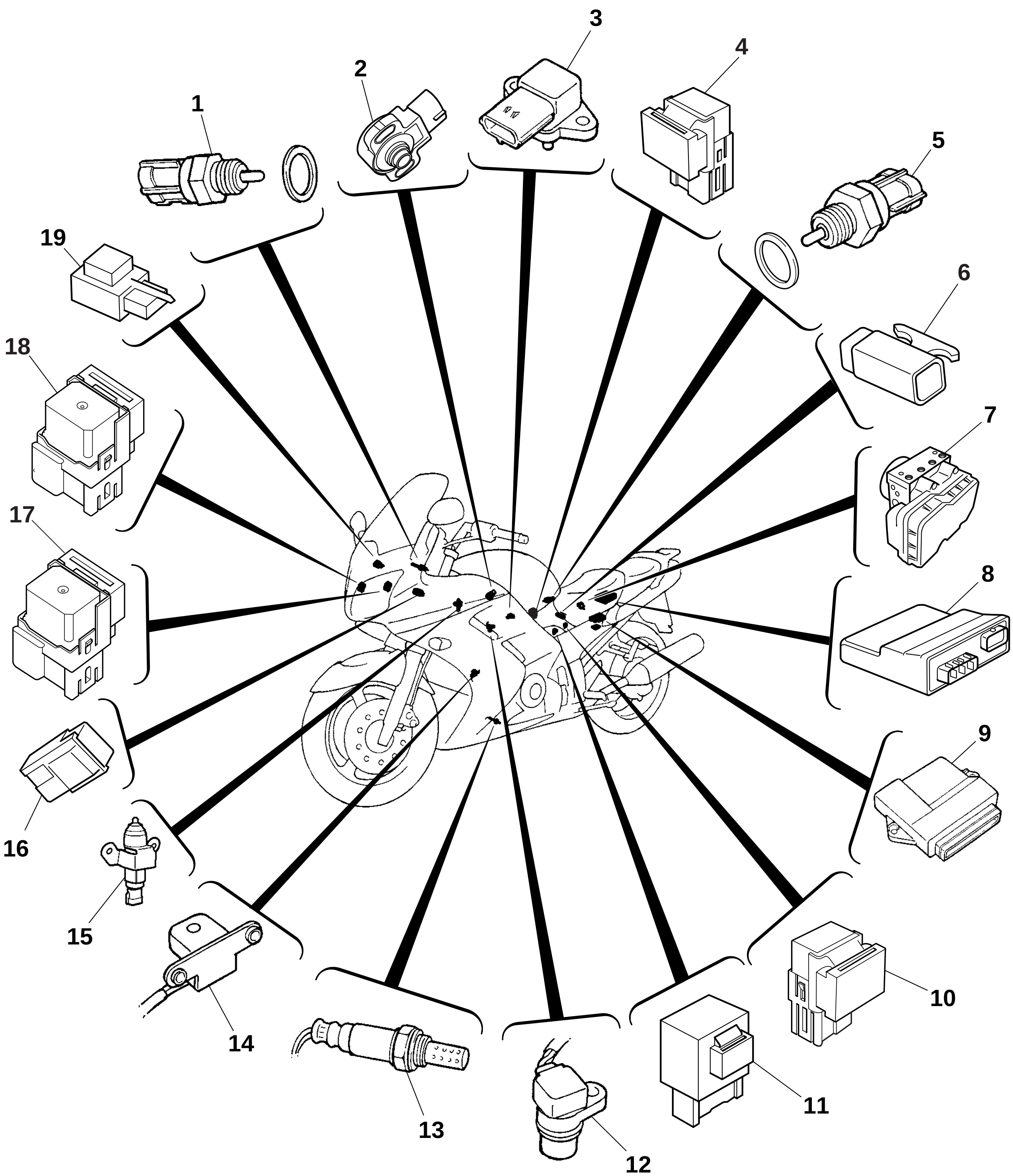
1. Coolant temperature sensor
2. Throttle position sensor
3. Intake air pressure sensor
4. Brake light relay
5. Intake air temperature sensor
6. Lean angle sensor
7. Hydraulic unit assembly
8. ECU (engine control unit)
9. Relay unit
10. Cylinder identification sensor
11. O_2 sensor
12. Crankshaft position sensor
13. Accessory box solenoid
14. Headlight relay (dimmer)
15. Radiator fan motor relay
16. Headlight (on/off)/grip warmer relay
17. Turn signal/hazard relay

FJR13AE



1. Windshield drive unit
2. Battery
3. Starter relay
4. ABS motor fuse
5. Front brake light switch
6. Fuse box 2
7. Fuse box 1
8. Right radiator fan motor
9. Left radiator fan motor
10. Neutral switch
11. Sidestand switch
12. YCC-S speed sensor
13. Oil level switch
14. Rear brake light switch
15. Left horn (low)
16. Right horn (high)
17. Ignition coil
18. Main fuse
19. Diode

FJR13AE

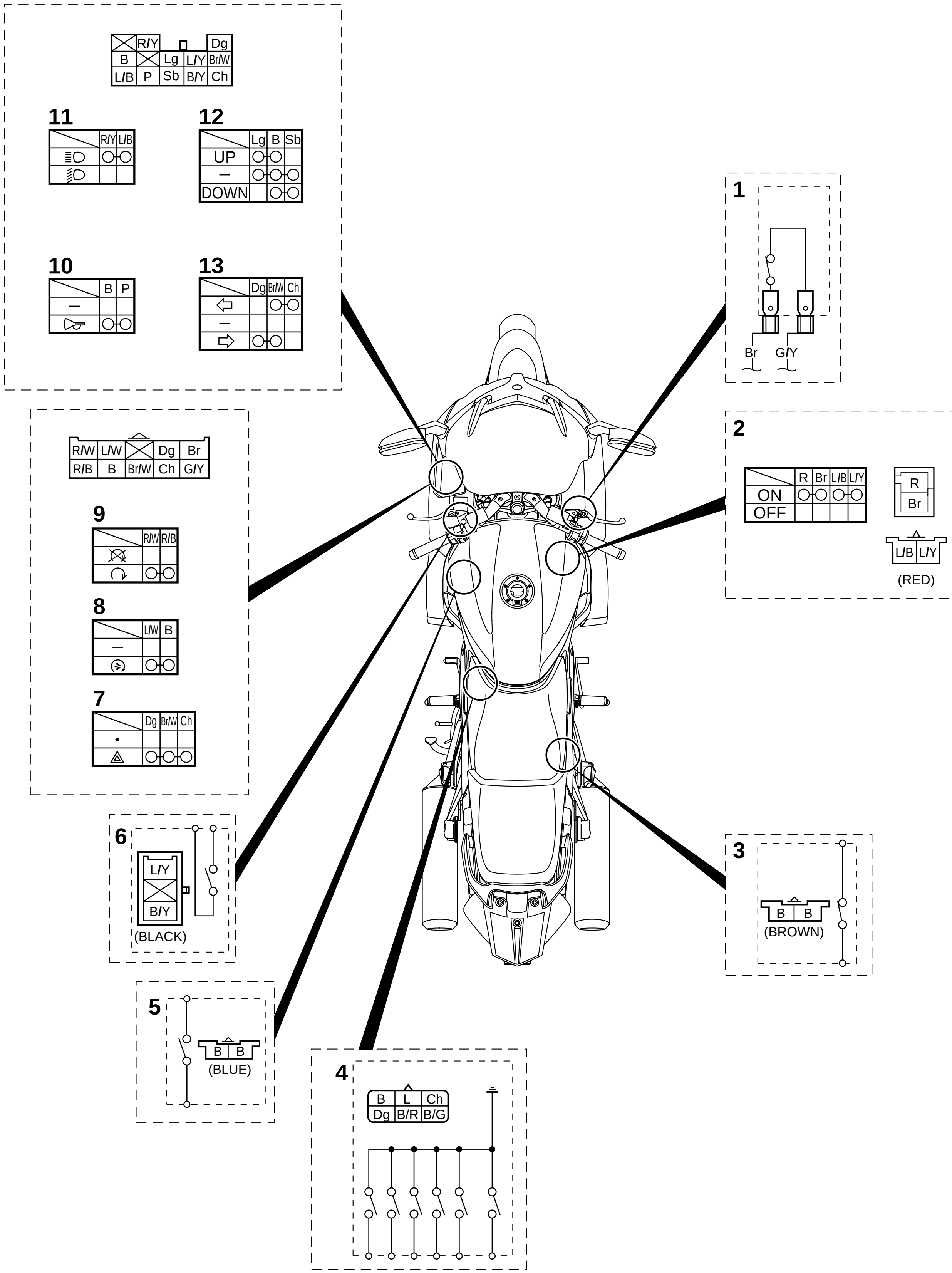


1. Coolant temperature sensor
2. Throttle position sensor
3. Intake air pressure sensor
4. Brake light relay
5. Intake air temperature sensor
6. Lean angle sensor
7. Hydraulic unit assembly
8. MCU (motor control unit)
9. ECU (engine control unit)
10. Relay unit
11. YCC-S control relay
12. Cylinder identification sensor
13. O_2 sensor
14. Crankshaft position sensor
15. Accessory box solenoid
16. Headlight relay (dimmer)
17. Radiator fan motor relay
18. Headlight (on/off)/grip warmer relay
19. Turn signal/hazard relay

EAS27980

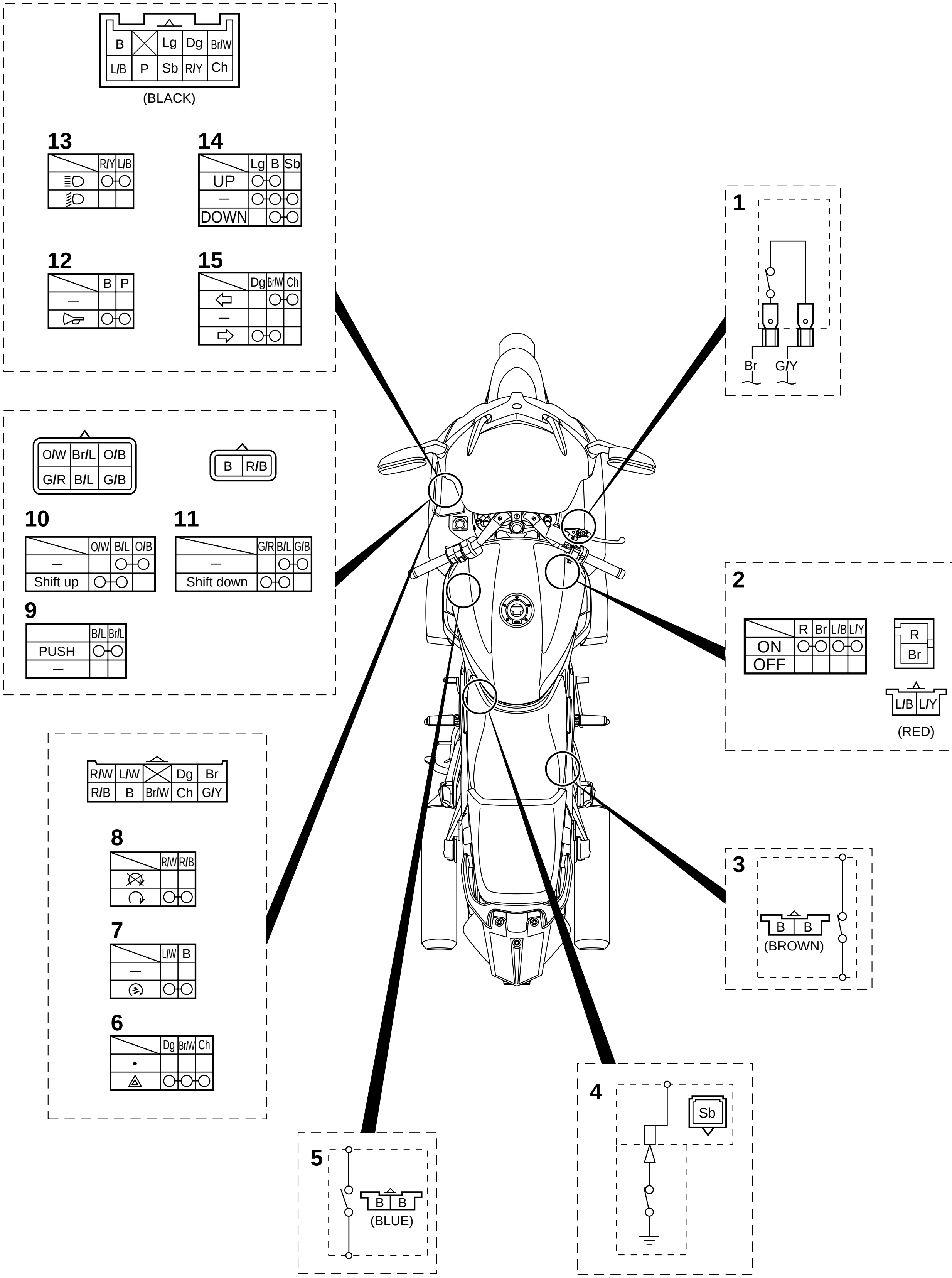
CHECKING THE SWITCHES

FJR13A



1. Front brake light switch
2. Main switch
3. Rear brake light switch
4. Gear position switch
5. Sidestand switch
6. Clutch switch
7. Hazard switch
8. Start switch
9. Engine stop switch
10. Horn switch
11. Dimmer switch
12. Windshield position switch
13. Turn signal switch

FJR13AE



B
Lg
Dg
Br/W
L/B
P
Sb
R/Y
Ch
(BLACK)
13
R/Y
L/B
14
Lg
B
Sb
UP
–
DOWN
12
B
P
–
15
Dg
Br/W
Ch
–
1
Br
G/Y
O/W
Br/L
O/B
G/R
B/L
G/B
B
R/B
10
O/W
B/L
O/B
–
Shift up
11
G/R
B/L
G/B
–
Shift down
9
B/L
Br/L
PUSH
–
2
R
Br
L/B
L/Y
ON
OFF
R
Br
L/B
L/Y
(RED)
R/W
L/W
Dg
Br
R/B
B
Br/W
Ch
G/Y
8
R/W
R/B
7
L/W
B
–
6
Dg
Br/W
Ch
3
B
B
(BROWN)
4
Sb
5
B
B
(BLUE)

1. Front brake light switch
2. Main switch
3. Rear brake light switch
4. Neutral switch
5. Sidestand switch
6. Hazard switch
7. Start switch
8. Engine stop switch
9. Hand shift select button
10. Hand shift lever switch (shift up)
11. Hand shift lever switch (shift down)
12. Horn switch
13. Dimmer switch
14. Windshield position switch
15. Turn signal switch

Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, check the wiring connections and if necessary, replace the switch.

ECA14370

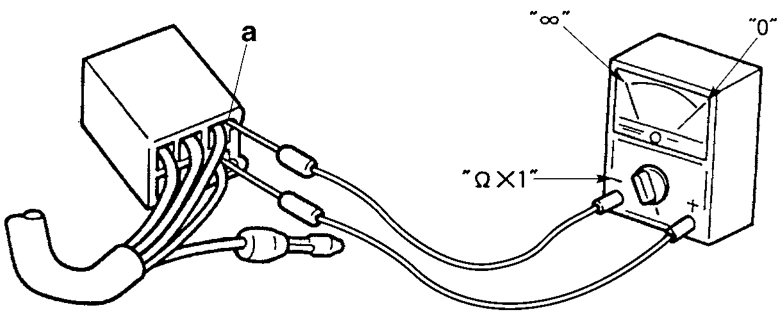
NOTICE

Never insert the tester probes into the coupler terminal slots “a”. Always insert the probes from the opposite end of the coupler, taking care not to loosen or damage the leads.

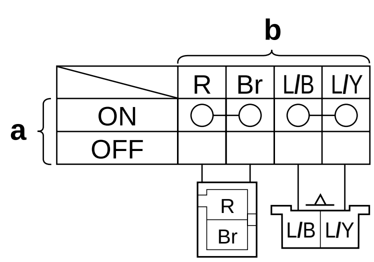
Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

TIP

- Before checking for continuity, set the pocket tester to “0” and to the “Ω × 1” range.
- When checking for continuity, switch back and forth between the switch positions a few times.



The switches and their terminal connections are illustrated as in the following example of the main switch.
The switch positions “a” are shown in the far left column and the switch lead colors “b” are shown in the top row.
The continuity (i. e., a closed circuit) between switch terminals at a given switch position is indicated by “ ○——○ ”. There is continuity between red and brown, blue/black and blue/yellow when the switch is set to “ON”.



EAS27990

CHECKING THE BULBS AND BULB SOCKETS

TIP

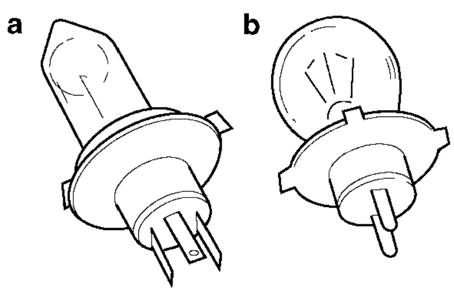
Do not check any of the lights that use LEDs.

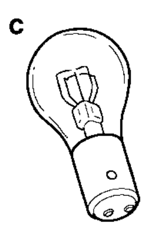
Check each bulb and bulb socket for damage or wear, proper connections, and also for continuity between the terminals.
Damage/wear → Repair or replace the bulb, bulb socket or both.
Improperly connected → Properly connect.
No continuity → Repair or replace the bulb, bulb socket or both.

Types of bulbs

The bulbs used on this vehicle are shown in the illustration.

- Bulbs “a” and “b” are used for the headlights and usually use a bulb holder that must be detached before removing the bulb. The majority of these types of bulbs can be removed from their respective sockets by turning them counterclockwise.
- Bulbs “c” are used for turn signal and tail/brake lights and can be removed from the socket by pushing and turning the bulb counterclockwise.





Checking the condition of the bulbs

The following procedure applies to all of the bulbs.

1. Remove:
   - Bulb

EW3P61001

WARNING

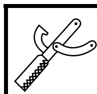
Since headlight bulbs get extremely hot, keep flammable products and your hands away from them until they have cooled down.

EC3P61002

NOTICE

- **Be sure to hold the socket firmly when removing the bulb. Never pull the lead, otherwise it may be pulled out of the terminal in the coupler.**
- **Avoid touching the glass part of a headlight bulb to keep it free from oil, otherwise the transparency of the glass, the life of the bulb, and the luminous flux will be adversely affected. If the headlight bulb gets soiled, thoroughly clean it with a cloth moistened with alcohol or lacquer thinner.**

2. Check:
   - Bulb (for continuity)
     (with the pocket tester)
     No continuity → Replace.



Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

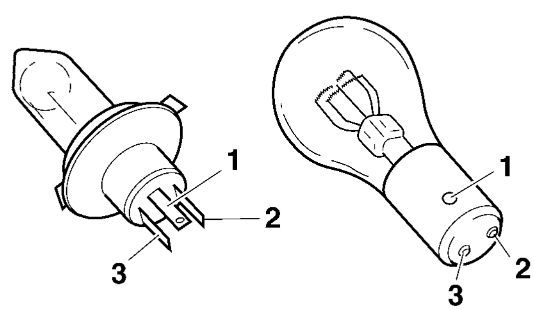
TIP

Before checking for continuity, set the pocket tester to “0” and to the “Ω × 1” range.

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Connect the positive tester probe to terminal “1” and the negative tester probe to terminal “2”, and check the continuity.
b. Connect the positive tester probe to terminal “1” and the negative tester probe to terminal “3”, and check the continuity.
c. If either of the readings indicate no continuity, replace the bulb.

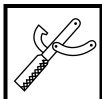
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Checking the condition of the bulb sockets

The following procedure applies to all of the bulb sockets.

1. Check:
   - Bulb socket (for continuity)
     (with the pocket tester)
     No continuity → Replace.



Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

TIP

Check each bulb socket for continuity in the same manner as described in the bulb section; however, note the following.

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a. Install a good bulb into the bulb socket.
b. Connect the pocket tester probes to the respective leads of the bulb socket.
c. Check the bulb socket for continuity. If any of the readings indicate no continuity, replace the bulb socket.

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EAS28000

CHECKING THE FUSES

The following procedure applies to all of the fuses.

EC3P61003

NOTICE

To avoid a short circuit, always turn the main switch to "OFF" when checking or replacing a fuse.

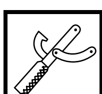
1. Remove:
   - Front cowling right inner panel 1
     Refer to "GENERAL CHASSIS" on page 4-1.
2. Check:
   - Fuse

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a. Connect the pocket tester to the fuse and check the continuity.

TIP

Set the pocket tester selector to "$\Omega \times 1$".



Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

b. If the pocket tester indicates "∞", replace the fuse.

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3. Replace:
   - Blown fuse

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a. Turn the main switch to "OFF".
b. Install a new fuse of the correct amperage rating.
c. Set on the switches to verify if the electrical circuit is operational.
d. If the fuse immediately blows again, check the electrical circuit.

Fuses	Amperage rating	Q'ty
Main	50 A	1
ABS motor	30 A	1
YCC-S motor control (FJR13AE)	30 A	1
Headlight	25 A	1
ABS solenoid	20 A	1
Fuel injection system	15 A	1
Signaling system	15 A	1
Left radiator fan motor	15 A	1
Right radiator fan motor	15 A	1
Ignition	10 A	1
Hazard lighting	10 A	1
ABS ECU	10 A	1
Backup (odometer, clock, and windshield drive system)	10 A	1
Auxiliary DC jack	3 A	1
Spare (FJR13A)	30 A	1
Spare (FJR13AE)	30 A	2
Spare	25 A	1
Spare	20 A	1
Spare	15 A	1
Spare	10 A	1
Spare	3 A	1

EWA13310

WARNING

Never use a fuse with an amperage rating other than that specified. Improvising or using a fuse with the wrong amperage rating may cause extensive damage to the electri-

cal system, cause the lighting and ignition systems to malfunction and could possibly cause a fire.

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4. Install:
   - Front cowling right inner panel 1
     Refer to "GENERAL CHASSIS" on page 4-1.

EAS28030

CHECKING AND CHARGING THE BATTERY

EWA13290

WARNING

Batteries generate explosive hydrogen gas and contain electrolyte which is made of poisonous and highly caustic sulfuric acid. Therefore, always follow these preventive measures:

- **Wear protective eye gear when handling or working near batteries.**
- **Charge batteries in a well-ventilated area.**
- **Keep batteries away from fire, sparks or open flames (e.g., welding equipment, lighted cigarettes).**
- **DO NOT SMOKE when charging or handling batteries.**
- **KEEP BATTERIES AND ELECTROLYTE OUT OF REACH OF CHILDREN.**
- **Avoid bodily contact with electrolyte as it can cause severe burns or permanent eye injury.**

FIRST AID IN CASE OF BODILY CONTACT:
EXTERNAL

- **Skin — Wash with water.**
- **Eyes — Flush with water for 15 minutes and get immediate medical attention.**

INTERNAL

- **Drink large quantities of water or milk followed with milk of magnesia, beaten egg or vegetable oil. Get immediate medical attention.**

EC3P61004

NOTICE

- **This is a sealed battery. Never remove the sealing caps because the balance between cells will not be maintained and battery performance will deteriorate.**
- **Charging time, charging amperage and charging voltage for an MF battery are different from those of conventional batteries. The MF battery should be charged according to the appropriate charging method. If the battery is overcharged, the electrolyte level will drop considerably. Therefore, take special care when charging the battery.**

TIP

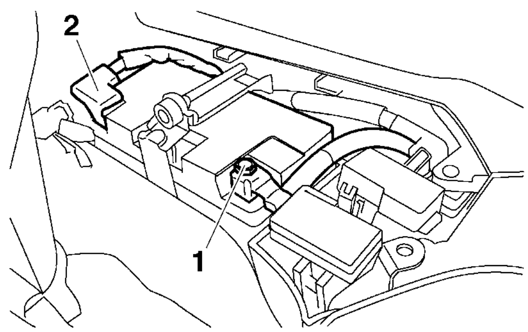
Since MF batteries are sealed, it is not possible to check the charge state of the battery by measuring the specific gravity of the electrolyte. Therefore, the charge of the battery has to be checked by measuring the voltage at the battery terminals.

1. Remove:
   - Front cowling right inner panel 1
     Refer to "GENERAL CHASSIS" on page 4-1.
2. Disconnect:
   - Battery leads
     (from the battery terminals)

ECA13640

NOTICE

First, disconnect the negative battery lead "1", and then positive battery lead "2".



3. Remove:
   - Battery
4. Check:
   - Battery charge

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a. Connect a pocket tester to the battery terminals.

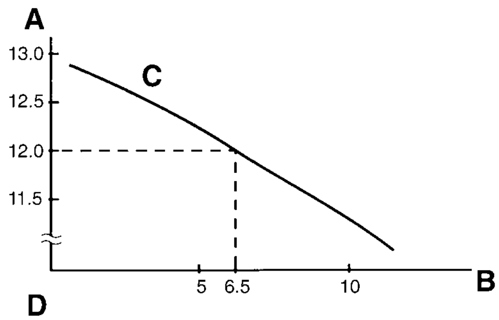
• Positive tester probe → positive battery terminal • Negative tester probe → negative battery terminal

TIP

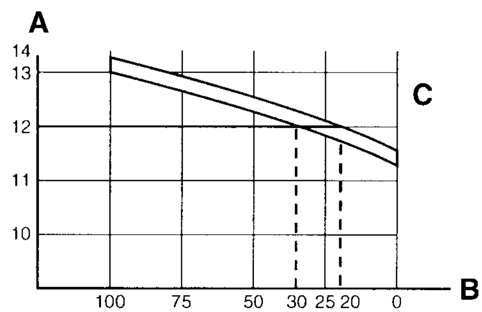
- The charge state of an MF battery can be checked by measuring its open-circuit voltage (i.e., the voltage when the positive battery terminal is disconnected).
- No charging is necessary when the open-circuit voltage equals or exceeds 12.8 V.

b. Check the charge of the battery, as shown in the charts and the following example.

Example
Open-circuit voltage = 12.0 V
Charging time = 6.5 hours
Charge of the battery = 20–30%



A. Open-circuit voltage (V)
B. Charging time (hours)
C. Relationship between the open-circuit voltage and the charging time at 20 °C (68 °F)
D. These values vary with the temperature, the condition of the battery plates, and the electrolyte level.



A. Open-circuit voltage (V)
B. Charging condition of the battery (%)
C. Ambient temperature 20 °C (68 °F)

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5. Charge:
   - Battery
     (refer to the appropriate charging method)

EWA13300

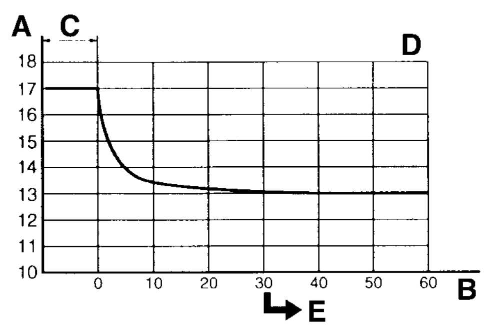
WARNING

Do not quick charge a battery.

ECA13670

NOTICE

- **Never remove the MF battery sealing caps.**
- **Do not use a high-rate battery charger since it forces a high-amperage current into the battery quickly and can cause battery overheating and battery plate damage.**
- **If it is impossible to regulate the charging current on the battery charger, be careful not to overcharge the battery.**
- **When charging a battery, be sure to remove it from the vehicle. (If charging has to be done with the battery mounted on the vehicle, disconnect the negative battery lead from the battery terminal.)**
- **To reduce the chance of sparks, do not plug in the battery charger until the battery charger leads are connected to the battery.**
- **Before removing the battery charger lead clips from the battery terminals, be sure to turn off the battery charger.**
- **Make sure the battery charger lead clips are in full contact with the battery terminal and that they are not shorted. A corroded battery charger lead clip may generate heat in the contact area and a weak clip spring may cause sparks.**
- **If the battery becomes hot to the touch at any time during the charging process, disconnect the battery charger and let the battery cool before reconnecting it. Hot batteries can explode!**
- **As shown in the following illustration, the open-circuit voltage of an MF battery stabilizes about 30 minutes after charging has been completed. Therefore, wait 30 minutes after charging is completed before measuring the open-circuit voltage.**



A. Open-circuit voltage (V)
B. Time (minutes)
C. Charging
D. Ambient temperature 20 °C (68 °F)
E. Check the open-circuit voltage.

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Charging method using a variable-current (voltage) charger

a. Measure the open-circuit voltage prior to charging.

TIP

Voltage should be measured 30 minutes after the engine is stopped.

b. Connect a charger and ammeter to the battery and start charging.

TIP

Set the charging voltage to 16–17 V. If the setting is lower, charging will be insufficient. If too high, the battery will be over-charged.

c. Make sure that the current is higher than the standard charging current written on the battery.

TIP

If the current is lower than the standard charging current written on the battery, set the charging voltage adjust dial at 20–24 V and monitor the amperage for 3–5 minutes to check the battery.

- Standard charging current is reached Battery is good.
- Standard charging current is not reached Replace the battery.

d. Adjust the voltage so that the current is at the standard charging level.
e. Set the time according to the charging time suitable for the open-circuit voltage.
f. If charging requires more than 5 hours, it is advisable to check the charging current after a lapse of 5 hours. If there is any change in the amperage, readjust the voltage to obtain the standard charging current.
g. Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.

12.8 V or more --- Charging is complete.
12.7 V or less --- Recharging is required.
Under 12.0 V --- Replace the battery.

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Charging method using a constant voltage charger

a. Measure the open-circuit voltage prior to charging.

TIP

Voltage should be measured 30 minutes after the engine is stopped.

b. Connect a charger and ammeter to the battery and start charging.
c. Make sure that the current is higher than the standard charging current written on the battery.

TIP

If the current is lower than the standard charging current written on the battery, this type of battery charger cannot charge the MF battery. A variable voltage charger is recommended.

d. Charge the battery until the battery's charging voltage is 15 V.

TIP

Set the charging time at 20 hours (maximum).

e. Measure the battery open-circuit voltage after leaving the battery unused for more than 30 minutes.

12.8 V or more --- Charging is complete.
12.7 V or less --- Recharging is required.
Under 12.0 V --- Replace the battery.

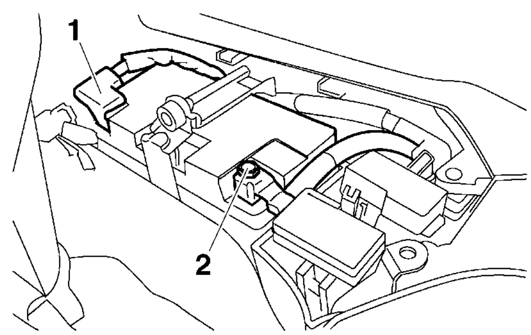
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6. Install:
   - Battery
7. Connect:
   - Battery leads
     (to the battery terminals)

ECA13630

NOTICE

First, connect the positive battery lead "1", and then the negative battery lead "2".



8. Check:
   - Battery terminals
     Dirt → Clean with a wire brush.
     Loose connection → Connect properly.
9. Lubricate:
   - Battery terminals

	Recommended lubricant **Dielectric grease**

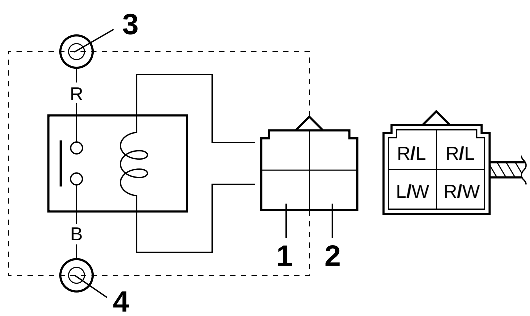
10. Install:
    - Front cowling right inner panel 1
      Refer to "GENERAL CHASSIS" on page 4-1.

EAS28040
CHECKING THE RELAYS
Check each switch for continuity with the pocket tester. If the continuity reading is incorrect, replace the relay.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

1. Disconnect the relay from the wire harness.
2. Connect the pocket tester (Ω × 1) and battery (12 V) to the relay terminals as shown.
   Check the relay operation.
   Out of specification → Replace.

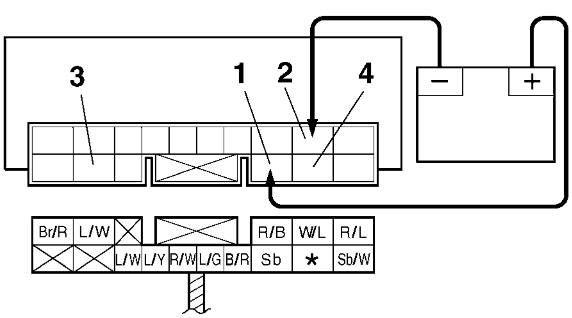
Starter relay



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between “3” and “4”)

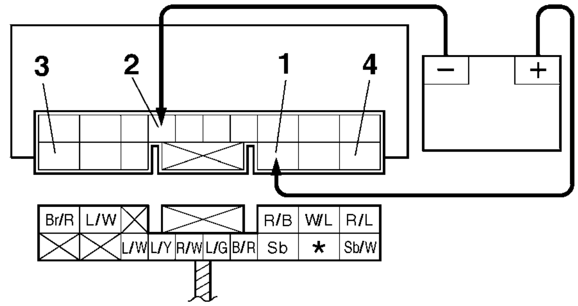
Relay unit (starting circuit cut-off relay)



*. FJR13A: B/Y
*. FJR13AE: B/R
1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between “3” and “4”)

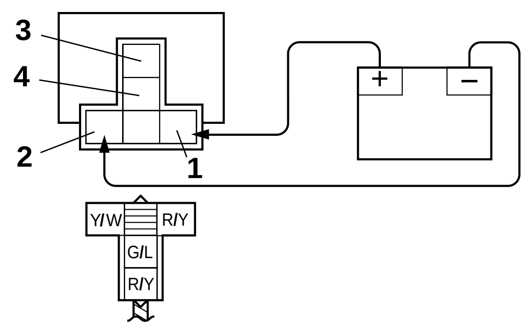
Relay unit (fuel pump relay)



*. FJR13A: B/Y
*. FJR13AE: B/R
1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between “3” and “4”)

Headlight (on/off)/grip warmer relay

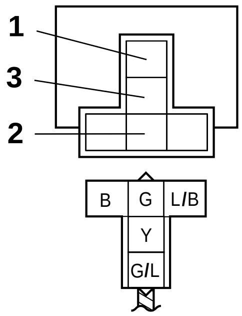


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
Continuity
(between “3” and “4”)

Headlight relay (dimmer)

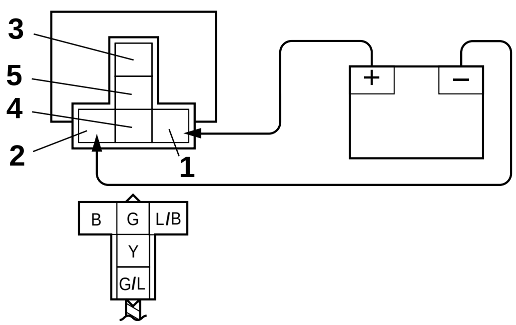
First step:



1. Positive tester probe
2. Negative tester probe
3. Negative tester probe

Result
Continuity
(between “1” and “2”)
No continuity
(between “1” and “3”)

Second step:

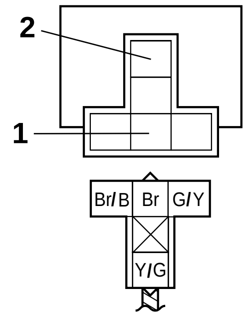


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe
5. Negative tester probe

Result
No continuity
(between “3” and “4”)
Continuity
(between “3” and “5”)

Brake light relay

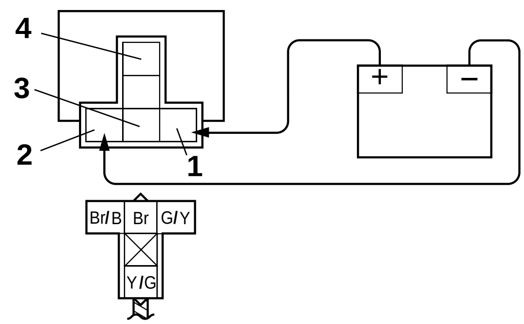
First step:



1. Positive tester probe
2. Negative tester probe

Result
Continuity
(between “1” and “2”)

Second step:

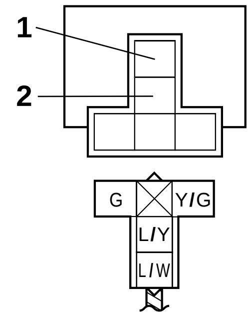


1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

Result
No continuity
(between “3” and “4”)

YCC-S control relay (FJR13AE)

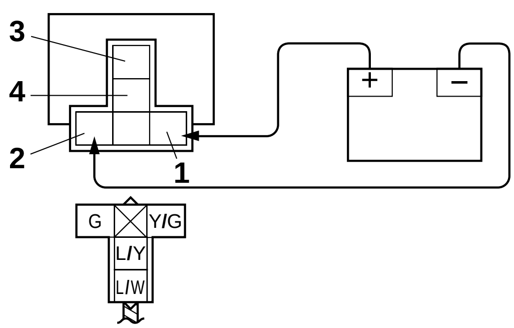
First step:



1. Positive tester probe
2. Negative tester probe

> **Result**
> **No continuity**
> **(between “1” and “2”)**

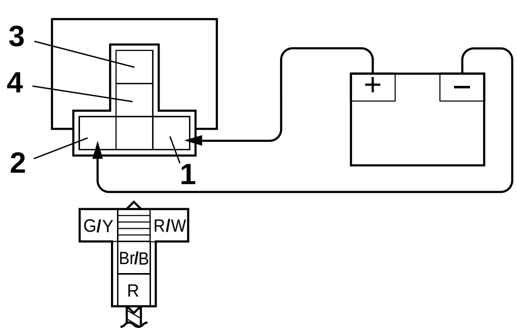
Second step:



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

> **Result**
> **Continuity**
> **(between “3” and “4”)**

Radiator fan motor relay



1. Positive battery terminal
2. Negative battery terminal
3. Positive tester probe
4. Negative tester probe

> **Result**
> **Continuity**
> **(between “3” and “4”)**

ET3P61014

CHECKING THE TURN SIGNAL/HAZARD RELAY

1. Check:
   - Turn signal/hazard relay input voltage
     Out of specification → The wiring circuit from the main switch to the turn signal/hazard relay coupler is faulty and must be repaired.

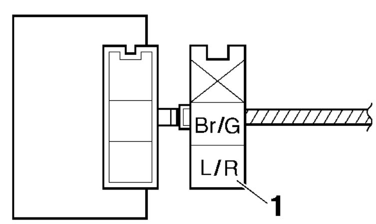
> **Turn signal/hazard relay input voltage**
> **DC 12 V**

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a. Connect the pocket tester (DC 20 V) to the turn signal/hazard relay terminal as shown.

> **Pocket tester**
> **90890-03112**
> **Analog pocket tester**
> **YU-03112-C**

- Positive tester probe → blue/red “1”
- Negative tester probe → ground



b. Turn the main switch to “ON”.
c. Measure the turn signal/hazard relay input voltage.

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2. Check:
   - Turn signal/hazard relay output voltage
     Out of specification → Replace.

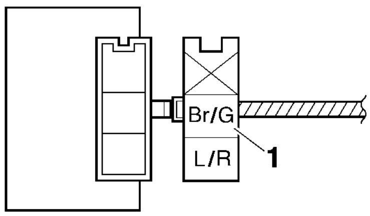
> **Turn signal/hazard relay output voltage**
> **DC 12 V**

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a. Connect the pocket tester (DC 20 V) to the turn signal/hazard relay terminal as shown.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

- Positive tester probe → brown/green “1”
- Negative tester probe → ground



b. Turn the main switch to “ON”.

c. Measure the turn signal/hazard relay output voltage.

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EAS28050

CHECKING THE RELAY UNIT (DIODE)

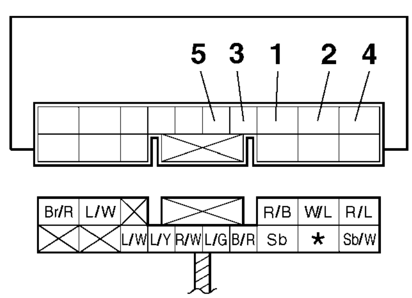
1. Check:
   - Relay unit (diode)
   Out of specification → Replace.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

TIP

The pocket tester and the analog pocket tester readings are shown in the following table.

Continuity
Positive tester probe → sky blue “1”
Negative tester probe → FJR13A black/yellow “2” FJR13AE black/red “2”
No continuity
Positive tester probe → FJR13A black/yellow “2” FJR13AE black/red “2”
Negative tester probe → sky blue “1”
Continuity
Positive tester probe → sky blue “1”
Negative tester probe → black/red “3”
No continuity
Positive tester probe → black/red “3”
Negative tester probe → sky blue “1”
Continuity
Positive tester probe → sky blue “1”
Negative tester probe → sky blue/white “4”
No continuity
Positive tester probe → sky blue/white “4”
Negative tester probe → sky blue “1”
Continuity
Positive tester probe → blue/green “5”
Negative tester probe → black/red “3”
No continuity
Positive tester probe → black/red “3”
Negative tester probe → blue/green “5”



*. FJR13A: B/Y

*. FJR13AE: B/R

a. Disconnect the relay unit coupler from the wire harness.
b. Connect the pocket tester (Ω × 1) to the relay unit terminal as shown.
c. Check the relay unit (diode) for continuity.
d. Check the relay unit (diode) for no continuity.

EAS28070
CHECKING THE SPARK PLUG CAPS

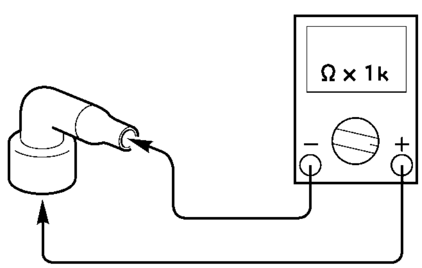
The following procedure applies to all of the spark plug caps.

1. Check:
   - Spark plug cap resistance
     Out of specification → Replace.

Resistance **10.0 kΩ**

a. Remove the spark plug cap from the spark plug lead.
b. Connect the pocket tester (Ω × 1k) to the spark plug cap as shown.

Pocket tester **90890-03112** **Analog pocket tester** **YU-03112-C**



c. Measure the spark plug cap resistance.

EAS28100
CHECKING THE IGNITION COILS

The following procedure applies to both of the ignition coils.

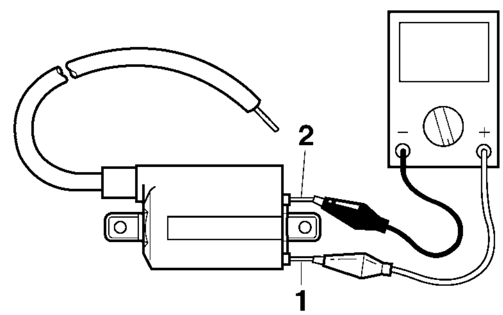
1. Check:
   - Primary coil resistance
     Out of specification → Replace.

Primary coil resistance **1.53–2.07 Ω at 20 °C (68 °F)**

a. Disconnect the ignition coil connectors from the ignition coil terminals.
b. Connect the pocket tester (Ω × 1) to the ignition coil as shown.

Pocket tester **90890-03112** **Analog pocket tester** **YU-03112-C**

- Positive tester probe → red/black or red/blue "1"
- Negative tester probe → orange or gray/red "2"



c. Measure the primary coil resistance.

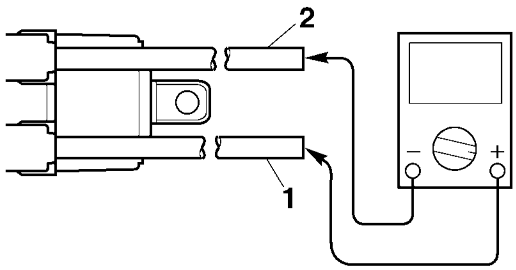
2. Check:
   - Secondary coil resistance
     Out of specification → Replace.

Secondary coil resistance **12–18 kΩ at 20 °C (68 °F)**

a. Disconnect the spark plug cap from the ignition coil.
b. Connect the pocket tester (Ω × 1k) to the ignition coil as shown.

Pocket tester **90890-03112** **Analog pocket tester** **YU-03112-C**

- Positive tester probe → Spark plug lead "1"
- Negative tester probe → Spark plug lead "2"



c. Measure the secondary coil resistance.

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ET3P61015

CHECKING THE IGNITION SPARK GAP

1. Check:
   - Ignition spark gap
     Out of specification → Perform the ignition system troubleshooting, starting with step 5. Refer to "TROUBLESHOOTING" on page 8-10.

Minimum ignition spark gap
6.0 mm (0.24 in)

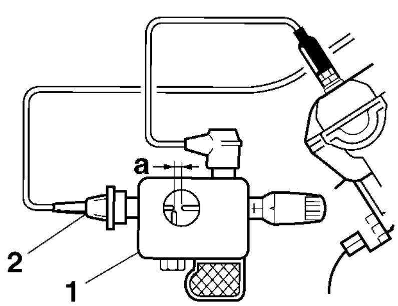
TIP

If the ignition spark gap is within specification, the ignition system circuit is operating normally.

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a. Disconnect the spark plug cap from the spark plug.
b. Connect the ignition checker "1" as shown.

Ignition checker
90890-06754
Opama pet-4000 spark checker
YM-34487



2. Spark plug cap

c. Turn the main switch to "ON" and engine stop switch to "○".
d. Measure the ignition spark gap "a".
e. Crank the engine by pushing the start switch "⊛" and gradually increase the spark gap until a misfire occurs.

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EAS28120

CHECKING THE CRANKSHAFT POSITION SENSOR

1. Disconnect:
   - Crankshaft position sensor coupler (from the wire harness)
2. Check:
   - Crankshaft position sensor resistance
     Out of specification → Replace the crankshaft position sensor.

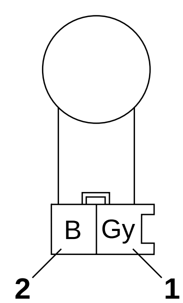
Crankshaft position sensor resistance
421–569 Ω at 20 °C (68 °F)

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a. Connect the pocket tester (Ω × 100) to the crankshaft position sensor coupler as shown.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

- Positive tester probe → gray "1"
- Negative tester probe → black "2"



b. Measure the crankshaft position sensor resistance.

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EAS28130

CHECKING THE LEAN ANGLE SENSOR

1. Remove:
   - Lean angle sensor
2. Check:
   - Lean angle sensor output voltage
     Out of specification → Replace.

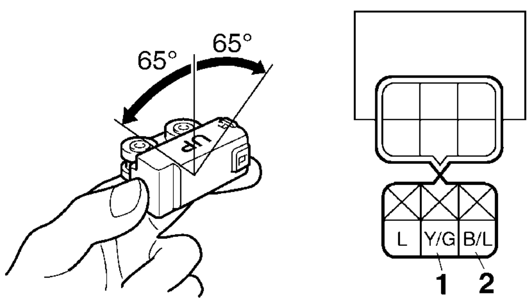
Lean angle sensor output voltage
Less than 65°: 0.4–1.4 V
More than 65°: 3.7–4.4 V

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a. Connect the lean angle sensor coupler to the wire harness.
b. Connect the pocket tester (DC 20 V) to the lean angle sensor coupler as shown.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

- Positive tester probe → yellow/green “1”
- Negative tester probe → black/blue “2”



c. Turn the main switch to “ON”.
d. Turn the lean angle sensor to 65°.
e. Measure the lean angle sensor output voltage.

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ET3P61016
CHECKING THE STARTER MOTOR OPERATION

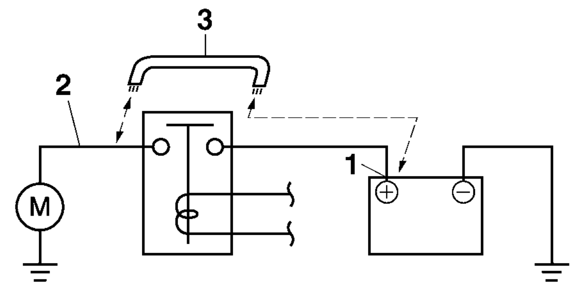
1. Check:
   - Starter motor operation
     Does not operate → Perform the electric starting system troubleshooting, starting with step 4.
     Refer to “TROUBLESHOOTING (FJR13A)” on page 8-23 and “TROUBLESHOOTING (FJR13AE)” on page 8-25.

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a. Connect the positive battery terminal “1” and starter motor lead “2” with a jumper lead “3”.

EWA13810
⚠ WARNING

- **A wire that is used as a jumper lead must have at least the same capacity of the battery lead, otherwise the jumper lead may burn.**
- **This check is likely to produce sparks, therefore, make sure no flammable gas or fluid is in the vicinity.**



b. Check the starter motor operation.

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EAS28150
CHECKING THE STATOR COIL

1. Disconnect:
   - Stator coil coupler (from the wire harness)
2. Check:
   - Stator coil resistance
     Out of specification → Replace the stator coil.

Stator coil resistance
0.13–0.19 Ω at 20 °C (68 °F)

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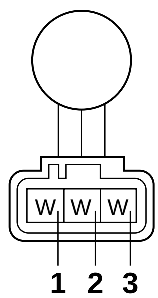
a. Connect the pocket tester (Ω × 1) to the stator coil coupler as shown.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

- Positive tester probe → white “1”
- Negative tester probe → white “2”

- Positive tester probe → white “1”
- Negative tester probe → white “3”

- Positive tester probe → white “2”
- Negative tester probe → white “3”



b. Measure the stator coil resistance.

EAS28170
CHECKING THE RECTIFIER/REGULATOR

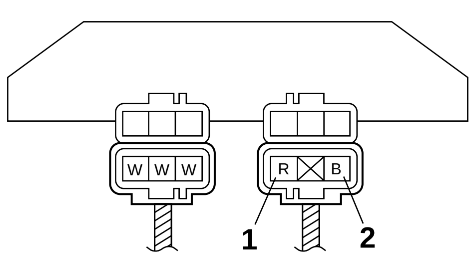
1. Check:
   - Charging voltage
     Out of specification → Replace the rectifier/regulator.

Charging voltage
14 V at 5000 r/min

a. Set the engine tachometer to the spark plug lead of cylinder-#1.
b. Connect the pocket tester (DC 20 V) to the rectifier/regulator coupler as shown.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

- Positive tester probe → red “1”
- Negative tester probe → black “2”



c. Start the engine and let it run at approximately 5000 r/min.
d. Measure the charging voltage.

EAS28180
CHECKING THE HORNS

The following procedure applies to both of the horns.

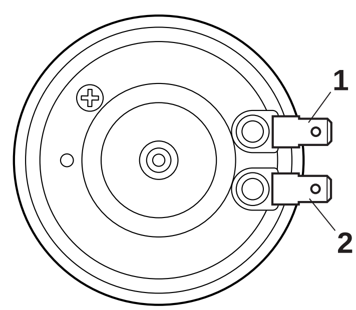
1. Check:
   - Horn resistance
     Out of specification → Replace.

Coil resistance
1.01–1.11 Ω at 20 °C (68 °F)

a. Disconnect the horn connectors from the horn terminals.
b. Connect the pocket tester (Ω × 1) to the horn terminals.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

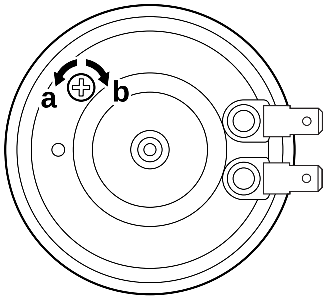
- Positive tester probe → horn terminal “1”
- Negative tester probe → horn terminal “2”



c. Measure the horn resistance.

2. Check:
   - Horn sound
     Faulty sound → Adjust or replace.

a. Connect a battery (12 V) to the horn.
b. Turn the adjusting screw in direction “a” or “b” until the horn sound is obtained.



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EAS28190

CHECKING THE OIL LEVEL SWITCH

1. Drain:
   - Engine oil
2. Remove:
   - Oil level switch
     (from the oil pan)
3. Check:
   - Oil level switch continuity
     Out of specification → Replace.

Oil level switch resistance
Minimum level position
No continuity
Maximum level position
Continuity

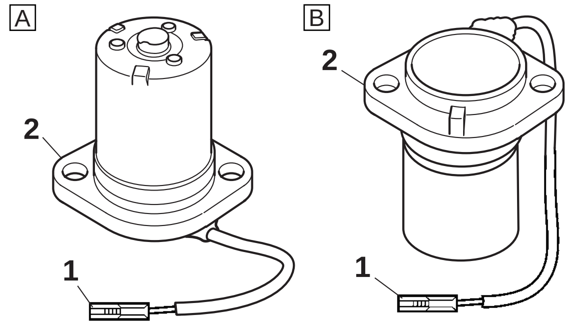
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a. Connect the pocket tester (Ω × 1) to the oil level switch terminal as shown.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

Minimum level position “A”
- Positive tester probe → white “1”
- Negative tester probe → body ground “2”

Maximum level position “B”
- Positive tester probe → white “1”
- Negative tester probe → body ground “2”



b. Measure the oil level switch resistance.

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EAS28220

CHECKING THE FUEL SENDER

1. Disconnect:
   - Fuel pump coupler
   - Fuel sender coupler
     (from the wire harness)
2. Remove:
   - Fuel tank
3. Remove:
   - Fuel pump
     (from the fuel tank)
4. Check:
   - Fuel sender resistance
     Out of specification → Replace the fuel pump assembly.

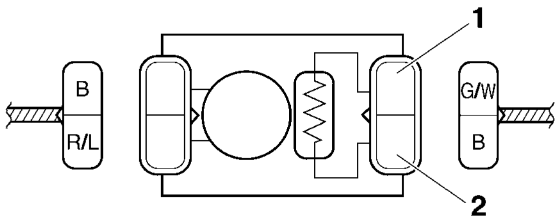
Fuel sender
Sender unit resistance (full)
19.0–21.0 Ω
Sender unit resistance (empty)
139.0–141.0 Ω

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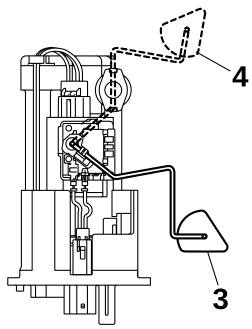
a. Connect the pocket tester (Ω × 10) to the fuel sender terminals as shown.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

- Positive tester probe → green/white “1”
- Negative tester probe → black “2”



b. Move the fuel sender float to minimum “3” and maximum “4” level position.



c. Measure the fuel sender resistance.

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EAS28250

CHECKING THE RADIATOR FAN MOTORS

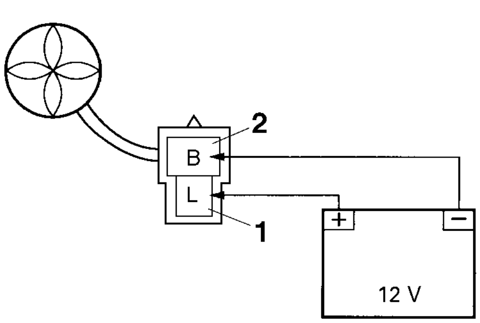
The following procedure applies to both of the radiator fan motors.

1. Check:
   • Radiator fan motor
   Faulty/rough movement → Replace.

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a. Disconnect the radiator fan motor coupler from the wire harness.
b. Connect the battery (DC 12 V) as shown.

• Positive battery terminal → blue “1” • Negative battery terminal → black “2”



c. Measure the radiator fan motor movement.

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EAS28260

CHECKING THE COOLANT TEMPERATURE SENSOR

1. Remove:
   • Coolant temperature sensor

EWA14130

⚠ WARNING

- **Handle the coolant temperature sensor with special care.**
- **Never subject the coolant temperature sensor to strong shocks. If the coolant temperature sensor is dropped, replace it.**

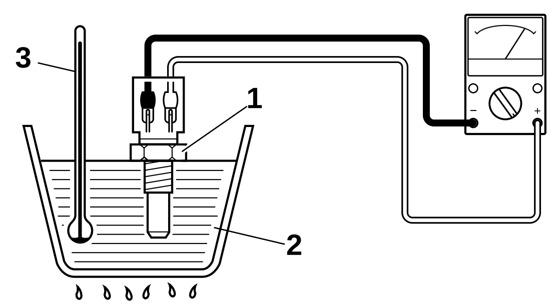
2. Check:
   • Coolant temperature sensor resistance
   Out of specification → Replace.

Coolant temperature sensor resistance **290–354 Ω at 80 °C (176 °F)**

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a. Connect the pocket tester (Ω × 100) to the coolant temperature sensor terminals as shown.

Pocket tester **90890-03112** **Analog pocket tester** **YU-03112-C**



b. Immerse the coolant temperature sensor “1” in a container filled with coolant “2”.

TIP

Make sure that the coolant temperature sensor terminals do not get wet.

c. Place a thermometer “3” in the coolant.
d. Slowly heat the coolant, and then let it cool down to the specified temperature.
e. Measure the coolant temperature sensor resistance.

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3. Install:
   • Coolant temperature sensor

Coolant temperature sensor
18 Nm (1.8 m·kg, 13 ft·lb)

EAS28300

CHECKING THE THROTTLE POSITION SENSOR

1. Remove:
   - Throttle position sensor (from the throttle body)
2. Check:
   - Throttle position sensor maximum resistance
     Out of specification → Replace the throttle position sensor.

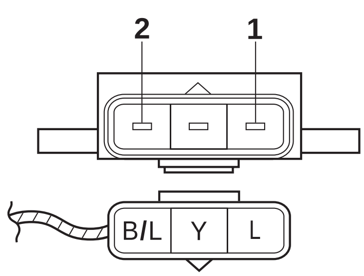
Resistance
2.00–3.00 kΩ

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a. Connect the pocket tester (Ω × 1k) to the throttle position sensor terminals as shown.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

- Tester positive lead → blue "1"
- Tester negative lead → black/blue "2"



b. Measure the throttle position sensor maximum resistance.

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3. Install:
   - Throttle position sensor

TIP

When installing the throttle position sensor, adjust its angle properly. Refer to "ADJUSTING THE THROTTLE POSITION SENSOR" on page 7-8.

EAS28370

CHECKING THE AIR INDUCTION SYSTEM SOLENOID

1. Check:
   - Air induction system solenoid resistance
     Out of specification → Replace.

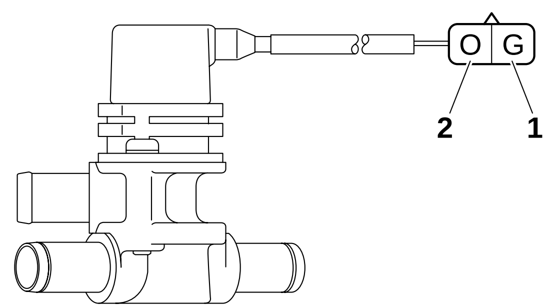
Solenoid resistance
19–25 Ω at 20 °C (68 °F)

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a. Disconnect the air induction system solenoid coupler from the wire harness.
b. Connect the pocket tester (Ω × 1) to the air induction system solenoid terminals as shown.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

- Positive tester probe → green "1"
- Negative tester probe → orange "2"



c. Measure the air induction system solenoid resistance.

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EAS28390

CHECKING THE CYLINDER IDENTIFICATION SENSOR

1. Remove:
   - Timing plate cover
2. Check:
   - Cylinder identification sensor output voltage
     Out of specification → Replace.

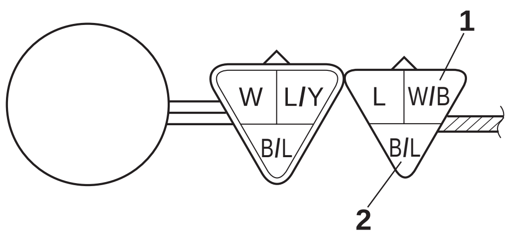
Cylinder identification sensor output voltage (ON)
More than 4.8 V
Cylinder identification sensor output voltage (OFF)
Less than 0.6 V

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a. Connect the pocket tester (DC 20 V) to the cylinder identification sensor coupler (wire harness side) as shown.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

- Positive tester probe → white/black “1”
- Negative tester probe → black/blue “2”



b. Turn the main switch to “ON”.
c. Rotate the crankshaft.
d. Measure the voltage of white/black and black/blue. Turn the crankshaft twice and check that the output voltage rises to approximately 4.8 V once.

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EAS28410

CHECKING THE INTAKE AIR PRESSURE SENSOR

1. Check:
   - Intake air pressure sensor output voltage
     Out of specification → Replace.

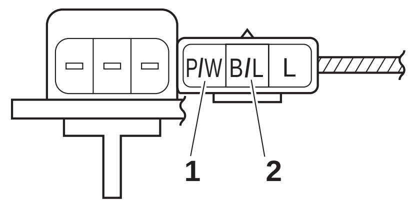
Intake air pressure sensor output voltage
3.75–4.25 V

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a. Connect the pocket tester (DC 20 V) to the intake air pressure sensor coupler as shown.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

- Positive tester probe → pink/white “1”
- Negative tester probe → black/blue “2”



b. Turn the main switch to “ON”.
c. Measure the intake air pressure sensor output voltage.

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EAS28420

CHECKING THE INTAKE AIR TEMPERATURE SENSOR

1. Remove:
   - Intake air temperature sensor (from the air filter case)

EWA14110

⚠ WARNING

- **Handle the intake air temperature sensor with special care.**
- **Never subject the intake air temperature sensor to strong shocks. If the intake air temperature sensor is dropped, replace it.**

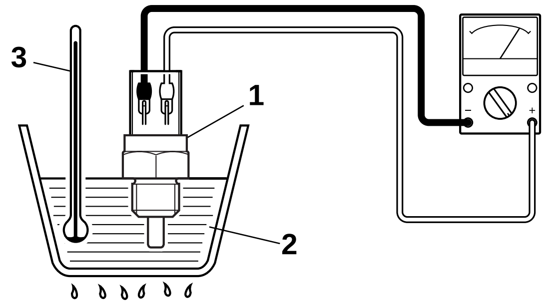
2. Check:
   - Intake air temperature sensor resistance
     Out of specification → Replace.

Intake air temperature sensor resistance
290–390 Ω at 80 °C (176 °F)

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a. Connect the pocket tester (Ω × 100) to the intake air temperature sensor terminals as shown.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C



b. Immerse the intake air temperature sensor "1" in a container filled with water "2".

TIP

Make sure that the intake air temperature sensor terminals do not get wet.

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c. Place a thermometer "3" in the water.
d. Slowly heat the water, then let it cool down to the specified temperature.
e. Measure the intake air temperature sensor resistance.

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ET3P61017

CHECKING THE ACCESSORY BOX SOLENOID

1. Check:
   - Accessory box solenoid resistance
     Out of specification → Replace.

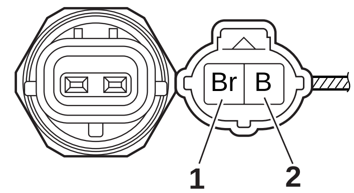
Accessory box solenoid resistance **19–21 Ω at 20 °C (68 °F)**

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a. Disconnect the accessory box solenoid coupler from the wire harness.
b. Connect the pocket tester (Ω × 10) to the accessory box solenoid terminals as shown.

Pocket tester **90890-03112** **Analog pocket tester** **YU-03112-C**

• Positive tester probe → brown "1" • Negative tester probe → black "2"



c. Measure the accessory box solenoid resistance.

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ET3P66023

CHECKING THE GRIP WARMERS (FJR13AE only)

The following procedure applies to both of the grip warmers.

1. Check:
   - Grip warmer resistance
     Out of specification → Replace the grip warmer.

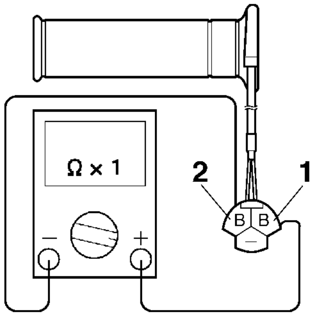
Grip warmer resistance (L) **FJR13AE 1.21–1.48 Ω at 20 °C (68 °F)** **Grip warmer resistance (R)** **FJR13AE 1.17–1.43 Ω at 20 °C (68 °F)**

▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼▼

a. Disconnect the grip warmer coupler from the front cowling wire harness.
b. Connect the pocket tester (Ω × 1) to the grip warmer coupler as shown.

Pocket tester **90890-03112** **Analog pocket tester** **YU-03112-C**

• Positive tester probe → black "1" • Negative tester probe → black "2"



c. Measure the grip warmer resistance.

ET3P66024

CHECKING THE GRIP WARMER CONTROL UNIT (FJR13AE only)

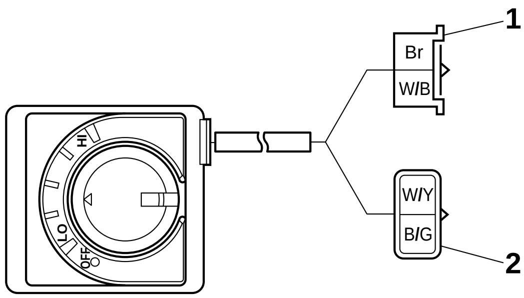
1. Check:
   - Grip warmer control unit continuity
     Out of specification → Replace.

Grip warmer control unit continuity
On
Continuity
Off
No continuity

a. Disconnect the grip warmer control unit couplers from the front cowling wire harness.
b. Connect the pocket tester (Ω × 1) to the grip warmer control unit coupler as shown.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

- Positive tester probe → brown “1”
- Negative tester probe → black/green “2”



c. Measure the grip warmer control unit resistance.

ET3P66020

CHECKING THE YCC-S SPEED SENSOR (FJR13AE only)

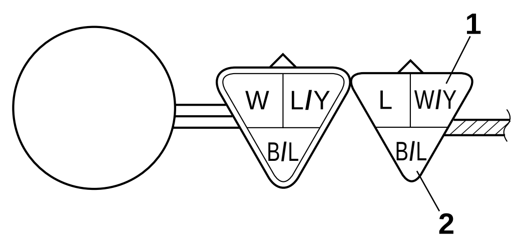
1. Check:
   - YCC-S speed sensor output voltage
     Out of specification → Replace.

Output voltage reading cycle
0.6 V to 4.8 V to 0.6 V to 4.8 V

a. Connect the pocket tester (DC 20 V) to the YCC-S speed sensor coupler (wire harness side) as shown.

Pocket tester
90890-03112
Analog pocket tester
YU-03112-C

- Positive tester probe → white/yellow “1”
- Negative tester probe → black/blue “2”



b. Turn the main switch to “ON”.
c. Elevate the rear wheel and slowly rotate it.
d. Measure the voltage of white/yellow and black/blue. With each full rotation of the rear wheel, the voltage reading should cycle from 0.6 V to 4.8 V to 0.6 V to 4.8 V.

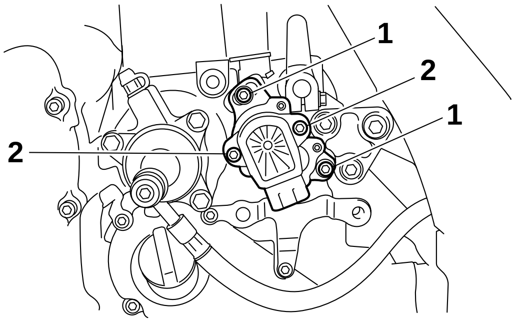
ET3P66021

CHECKING THE GEAR POSITION SENSOR (FJR13AE only)

1. Remove:
   - Gear position sensor

TIP

Remove only the screws “1” when removing the gear position sensor. Do not remove the screws “2”.



2. Check:
   - Gear position sensor maximum resistance
     Out of specification → Replace the gear position sensor.

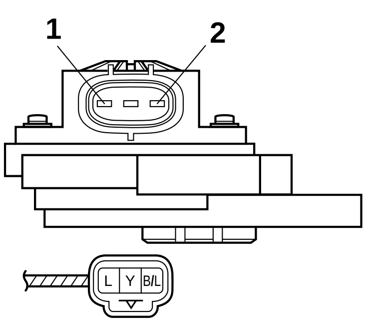
	Resistance **FJR13AE 4.0–6.0 kΩ**

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a. Connect the pocket tester (Ω × 1k) to the gear position sensor terminals as shown.

	Pocket tester **90890-03112** **Analog pocket tester** **YU-03112-C**

- Positive tester probe → blue “1”
- Negative tester probe → black/blue “2”



b. Measure the gear position sensor maximum resistance.

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3. Install:
   - Gear position sensor
     Refer to “INSTALLING THE GEAR POSITION SENSOR (FJR13AE only)” on page 5-11.

ET3P66022

CHECKING THE FOOT SHIFT SWITCH (FJR13AE only)

1. Remove:
   - Foot shift switch
2. Check:
   - Foot shift switch maximum resistance
     Out of specification → Replace the foot shift switch.

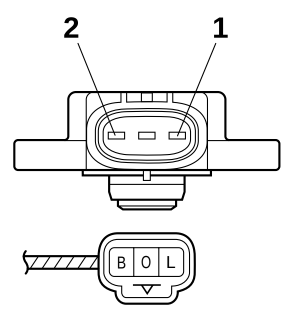
	Resistance **FJR13AE 4.0–6.0 kΩ**

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a. Connect the pocket tester (Ω × 1k) to the foot shift switch terminals as shown.

	Pocket tester **90890-03112** **Analog pocket tester** **YU-03112-C**

- Positive tester probe → blue “1”
- Negative tester probe → black “2”



b. Measure the foot shift switch maximum resistance.

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3. Install:
   - Foot shift switch
     Refer to “INSTALLING THE FOOT SHIFT SWITCH” on page 5-75.

ET3P66025

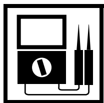
CHECKING THE DIODE (FJR13AE only)

1. Check:
   - Diode
     Out of specification → Replace.

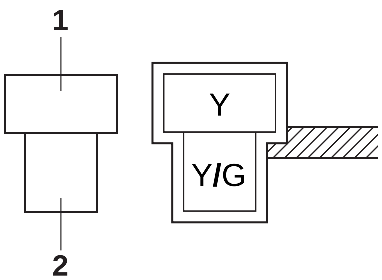
	Pocket tester **90890-03112** **Analog pocket tester** **YU-03112-C**

TIP

The pocket tester and the analog pocket tester readings are shown in the following table.



Continuity
Positive tester probe → yellow "1"
Negative tester probe → yellow/green "2"
No continuity
Positive tester probe → yellow/green "2"
Negative tester probe → yellow "1"



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a. Remove the diode from the wire harness.
b. Connect the pocket tester (Ω × 1) to the diode 2 terminals as shown.
c. Check the diode for continuity.
d. Check the diode for no continuity.

▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲▲

TROUBLESHOOTING

EAS28450
TROUBLESHOOTING

EAS28460
GENERAL INFORMATION

TIP

The following guide for troubleshooting does not cover all the possible causes of trouble. It should be helpful, however, as a guide to basic troubleshooting. Refer to the relative procedure in this manual for checks, adjustments, and replacement of parts.

EAS28470
STARTING FAILURES

Engine

1. Cylinder(s) and cylinder head
   - Loose spark plug
   - Loose cylinder head
   - Damaged cylinder head gasket
   - Worn or damaged cylinder
   - Incorrect valve clearance
   - Improperly sealed valve
   - Incorrect valve-to-valve-seat contact
   - Incorrect valve timing
   - Faulty valve spring
   - Seized valve
2. Piston(s) and piston ring(s)
   - Improperly installed piston ring
   - Damaged, worn or fatigued piston ring
   - Seized piston ring
   - Seized or damaged piston
3. Air filter
   - Improperly installed air filter
   - Clogged air filter element
4. Crankcase and crankshaft
   - Improperly assembled crankcase
   - Seized crankshaft

Fuel system

1. Fuel tank
   - Empty fuel tank
   - Clogged fuel tank overflow hose
   - Clogged rollover valve (for California only)
   - Clogged rollover valve hoses (for California only)
   - Deteriorated or contaminated fuel
2. Fuel pump
   - Faulty fuel pump
   - Faulty fuel pump relay
3. Throttle body(-ies)
   - Deteriorated or contaminated fuel
   - Sucked-in air

Electrical system

1. Battery
   - Discharged battery
   - Faulty battery
2. Fuse(s)
   - Blown, damaged or incorrect fuse
   - Improperly installed fuse
3. Spark plug(s)
   - Incorrect spark plug gap
   - Incorrect spark plug heat range
   - Fouled spark plug
   - Worn or damaged electrode
   - Worn or damaged insulator
   - Faulty spark plug cap
4. Ignition coil(s)
   - Cracked or broken ignition coil body
   - Broken or shorted primary or secondary coils
   - Faulty spark plug lead
5. Ignition system
   - Faulty ECU
   - Faulty crankshaft position sensor
   - Faulty cylinder identification sensor
   - Broken generator rotor woodruff key
6. Switches and wiring
   - Faulty main switch
   - Faulty engine stop switch
   - Broken or shorted wiring
   - Faulty gear position switch (neutral circuit) (FJR13A)
   - Faulty neutral switch (FJR13AE)
   - Faulty start switch
   - Faulty sidestand switch
   - Faulty clutch switch (FJR13A)
   - Faulty front, rear, or both brake light switches (FJR13AE)
   - Improperly grounded circuit
   - Loose connections
7. Starting system
   - Faulty starter motor
   - Faulty starter relay
   - Faulty starting circuit cut-off relay
   - Faulty starter clutch

EAS28490
INCORRECT ENGINE IDLING SPEED

Engine

1. Cylinder(s) and cylinder head
   - Incorrect valve clearance
   - Damaged valve train components
2. Air filter
   - Clogged air filter element

Fuel system

1. Throttle body(-ies)
   - Damaged or loose throttle body joint
   - Improperly synchronized throttle bodies
   - Improperly adjusted engine idling speed (throttle stop screw)
   - Improper throttle cable free play
   - Flooded throttle body
   - Faulty air induction system

Electrical system

1. Battery
   - Discharged battery
   - Faulty battery
2. Spark plug(s)
   - Incorrect spark plug gap
   - Incorrect spark plug heat range
   - Fouled spark plug
   - Worn or damaged electrode
   - Worn or damaged insulator
   - Faulty spark plug cap
3. Ignition coil(s)
   - Broken or shorted primary or secondary coils
   - Faulty spark plug lead
   - Cracked or broken ignition coil
4. Ignition system
   - Faulty ECU
   - Faulty crankshaft position sensor
   - Faulty cylinder identification sensor
   - Broken generator rotor woodruff key

EAS28510

POOR MEDIUM-AND-HIGH-SPEED PERFORMANCE

Refer to “STARTING FAILURES” on page 9-1.

Engine

1. Air filter
   - Clogged air filter element

Fuel system

1. Fuel pump
   - Faulty fuel pump

EAS28530

FAULTY GEAR SHIFTING

Shifting is difficult

Refer to “Clutch drags”.

EAS28540

SHIFT PEDAL DOES NOT MOVE

Shift shaft

- Improperly adjusted shift rod
- Bent shift shaft

Shift drum and shift forks

- Foreign object in a shift drum groove
- Seized shift fork
- Bent shift fork guide bar

Transmission

- Seized transmission gear
- Foreign object between transmission gears
- Improperly assembled transmission

EAS28550

JUMPS OUT OF GEAR

Shift shaft

- Incorrect shift pedal position
- Improperly returned stopper lever

Shift forks

- Worn shift fork

Shift drum

- Incorrect axial play
- Worn shift drum groove

Transmission

- Worn gear dog

EAS28570

FAULTY CLUTCH

Clutch slips

1. Clutch
   - Improperly assembled clutch
   - Improperly assembled clutch master cylinder
   - Improperly assembled clutch release cylinder
   - Incorrect clutch fluid level
   - Damaged clutch hose
   - Loose or fatigued clutch spring plate
   - Loose union bolt
   - Worn friction plate
   - Worn clutch plate
   - Damaged clutch release cylinder
2. Engine oil
   - Incorrect oil level
   - Incorrect oil viscosity (low)
   - Deteriorated oil

Clutch drags

1. Clutch
   - Air in hydraulic clutch system
   - Warped pressure plate
   - Bent clutch plate
   - Swollen friction plate
   - Bent clutch push rod
   - Damaged clutch boss

- Burnt primary driven gear bushing
- Damaged clutch release cylinder
- Match marks not aligned

2. Engine oil
   - Incorrect oil level
   - Incorrect oil viscosity (high)
   - Deteriorated oil

EAS28600

OVERHEATING

Engine

1. Clogged coolant passages
   - Cylinder head and piston(s)
   - Heavy carbon buildup
2. Engine oil
   - Incorrect oil level
   - Incorrect oil viscosity
   - Inferior oil quality

Cooling system

1. Coolant
   - Low coolant level
2. Radiator
   - Damaged or leaking radiator
   - Faulty radiator cap
   - Bent or damaged radiator fin
3. Water pump
   - Damaged or faulty water pump
4. Thermostat
   - Thermostat stays closed
5. Oil cooler
   - Clogged or damaged oil cooler
6. Hose(s) and pipe(s)
   - Damaged hose
   - Improperly connected hose
   - Damaged pipe
   - Improperly connected pipe

Fuel system

1. Throttle body(-ies)
   - Damaged or loose throttle body joint
2. Air filter
   - Clogged air filter element

Chassis

1. Brake(s)
   - Dragging brake

Electrical system

1. Spark plug(s)
   - Incorrect spark plug gap
   - Incorrect spark plug heat range
2. Ignition system
   - Faulty ECU

EAS28610

OVERCOOLING

Cooling system

1. Thermostat
   - Thermostat stays open

EAS28620

POOR BRAKING PERFORMANCE

- Worn brake pad
- Worn brake disc
- Air in hydraulic brake system
- Leaking brake fluid
- Faulty brake caliper kit
- Faulty brake caliper seal
- Loose union bolt
- Damaged brake hose
- Oil or grease on the brake disc
- Oil or grease on the brake pad
- Incorrect brake fluid level

EAS28660

FAULTY FRONT FORK LEGS

Leaking oil

- Bent, damaged or rusty inner tube
- Cracked or damaged outer tube
- Improperly installed oil seal
- Damaged oil seal lip
- Incorrect oil level (high)
- Loose damper rod assembly bolt
- Damaged damper rod assembly bolt copper washer
- Cracked or damaged cap bolt O-ring

Malfunction

- Bent or damaged inner tube
- Bent or damaged outer tube
- Damaged fork spring
- Worn or damaged outer tube bushing
- Bent or damaged damper rod
- Incorrect oil viscosity
- Incorrect oil level

EAS28680

UNSTABLE HANDLING

Handlebars

- Bent or improperly installed right handlebar
- Bent or improperly installed left handlebar

1. Steering head components
   - Improperly installed upper bracket

- Improperly installed lower bracket (improperly tightened ring nut)
- Bent steering stem
- Damaged ball bearing or bearing race

2. Front fork leg(s)
   - Uneven oil levels (both front fork legs)
   - Unevenly tensioned fork spring (both front fork legs)
   - Broken fork spring
   - Bent or damaged inner tube
   - Bent or damaged outer tube
3. Swingarm
   - Worn bearing or bushing
   - Bent or damaged swingarm

Rear shock absorber assembly
- Faulty rear shock absorber spring
- Leaking oil or gas

Tire(s)
- Uneven tire pressures (front and rear)
- Incorrect tire pressure
- Uneven tire wear

Wheel(s)
- Incorrect wheel balance
- Deformed cast wheel
- Damaged wheel bearing
- Bent or loose wheel axle
- Excessive wheel runout

Frame
- Bent frame
- Damaged steering head pipe
- Improperly installed bearing race

EAS28710
FAULTY LIGHTING OR SIGNALING SYSTEM

Headlight does not come on
- Wrong headlight bulb
- Too many electrical accessories
- Hard charging
- Incorrect connection
- Improperly grounded circuit
- Poor contacts (main switch)
- Burnt-out headlight bulb

Headlight bulb burnt out
- Wrong headlight bulb
- Faulty battery
- Faulty rectifier/regulator
- Improperly grounded circuit
- Faulty main switch
- Headlight bulb life expired

Tail/brake light does not come on
- Wrong tail/brake light bulb
- Too many electrical accessories
- Incorrect connection
- Burnt-out tail/brake light bulb

Tail/brake light bulb burnt out
- Wrong tail/brake light bulb
- Faulty battery
- Incorrectly adjusted rear brake light switch
- Tail/brake light bulb life expired

Turn signal does not come on
- Faulty turn signal switch
- Faulty turn signal/hazard relay
- Burnt-out turn signal bulb
- Incorrect connection
- Damaged or faulty wire harness
- Improperly grounded circuit
- Faulty battery
- Blown, damaged or incorrect fuse

Turn signal flashes slowly
- Faulty turn signal/hazard relay
- Faulty main switch
- Faulty turn signal switch
- Incorrect turn signal bulb

Turn signal remains lit
- Faulty turn signal/hazard relay
- Burnt-out turn signal bulb

Turn signal flashes quickly
- Incorrect turn signal bulb
- Faulty turn signal/hazard relay
- Burnt-out turn signal bulb

Horn does not sound
- Improperly adjusted horn
- Damaged or faulty horn
- Faulty main switch
- Faulty horn switch
- Faulty battery
- Blown, damaged or incorrect fuse
- Faulty wire harness

EAS28740

WIRING DIAGRAM

FJR13AY(C) 2009

1. Main switch
2. Rectifier/regulator
3. AC magneto
4. ABS solenoid fuse
5. ABS ECU fuse
6. Fuel injection system fuse
7. Backup fuse (odometer, clock, and windshield drive system)
8. Main fuse
9. Coupler 1 (wire harness–front cowling wire harness)
10. Battery
11. ABS motor fuse
12. Starter relay
13. Starter motor
14. Oil level switch
15. Fuel pump
16. Fuel sender
17. Gear position switch
18. Coupler 2 (wire harness–front cowling wire harness)
19. Coupler 3 (wire harness–front cowling wire harness)
20. Relay unit
21. Starting circuit cut-off relay
22. Fuel pump relay
23. Sidestand switch
24. ABS test coupler
25. ABS ECU (electronic control unit)
26. Front wheel sensor
27. Rear wheel sensor
28. Rear brake light switch
29. Brake light relay
30. License plate light
31. Taillight assembly
32. Tail/brake light
33. Rear left turn signal light
34. Rear right turn signal light
35. Cylinders-#1/#4 ignition coil
36. Spark plug
37. Cylinders-#2/#3 ignition coil
38. Injector #4
39. Injector #3
40. Injector #2
41. Injector #1
42. Air induction system solenoid
43. ECU (engine control unit)
44. Crankshaft position sensor
45. Lean angle sensor
46. Intake air temperature sensor
47. Coolant temperature sensor
48. O_2 sensor
49. Cylinder identification sensor
50. Throttle position sensor
51. Intake air pressure sensor
52. Coupler 4 (wire harness–front cowling wire harness)
53. Headlight (on/off)/grip warmer relay
54. Hazard lighting fuse
55. Signaling system fuse
56. Headlight fuse
57. Ignition fuse
58. Auxiliary DC jack fuse
59. Grip warmer control unit (OPTION)
60. Radiator fan motor relay
61. Left radiator fan motor fuse
62. Left radiator fan motor
63. Right radiator fan motor fuse
64. Right radiator fan motor
65. Turn signal/hazard relay
66. Right handlebar switch
67. Front brake light switch
68. Engine stop switch
69. Start switch
70. Hazard switch
71. Left handlebar switch
72. Clutch switch
73. Dimmer switch
74. Windshield position switch
75. Turn signal switch
76. Horn switch
77. Accessory box solenoid
78. Left grip warmer (OPTION)
79. Right grip warmer (OPTION)
80. Meter assembly
81. Neutral indicator light
82. ABS warning light
83. Multi-function meter
84. Oil level warning light
85. Engine trouble warning light
86. Meter light
87. High beam indicator light
88. Right turn signal indicator light
89. Left turn signal indicator light
90. Thermistor
91. Horn
92. Front left turn signal/position light
93. Front right turn signal/position light
94. Headlight relay (dimmer)
95. Headlight assembly
96. Headlight
97. Auxiliary DC jack
98. Windshield drive unit

EAS28750

COLOR CODE

B	Black
Br	Brown
Ch	Chocolate
Dg	Dark green
G	Green
Gy	Gray
L	Blue
Lg	Light green
O	Orange
P	Pink
R	Red
Sb	Sky blue
W	White
Y	Yellow
B/G	Black/Green
B/L	Black/Blue
B/R	Black/Red
B/W	Black/White
B/Y	Black/Yellow
Br/B	Brown/Black
Br/G	Brown/Green
Br/L	Brown/Blue
Br/R	Brown/Red
Br/W	Brown/White
Br/Y	Brown/Yellow
G/B	Green/Black
G/L	Green/Blue
G/R	Green/Red
G/W	Green/White
G/Y	Green/Yellow
Gy/R	Gray/Red
Gy/W	Gray/White
L/B	Blue/Black
L/G	Blue/Green
L/R	Blue/Red
L/W	Blue/White
L/Y	Blue/Yellow
Lg/W	Light green/White
O/B	Orange/Black
P/W	Pink/White
R/B	Red/Black
R/G	Red/Green
R/L	Red/Blue
R/W	Red/White
R/Y	Red/Yellow
Sb/W	Sky blue/White
W/B	White/Black
W/L	White/Blue
W/Y	White/Yellow
Y/G	Yellow/Green
Y/L	Yellow/Blue
Y/R	Yellow/Red
Y/W	Yellow/White

ET3P66050

WIRING DIAGRAM

FJR13AEY(C) 2009

1. Main switch
2. Rectifier/regulator
3. AC magneto
4. ABS solenoid fuse
5. ABS ECU fuse
6. Fuel injection system fuse
7. Backup fuse (odometer, clock, and windshield drive system)
8. Main fuse
9. Battery
10. ABS motor fuse
11. Starter relay
12. Starter motor
13. Coupler 1 (wire harness–front cowling wire harness)
14. Coupler 2 (wire harness–front cowling wire harness)
15. Fuel pump
16. Fuel sender
17. Oil level switch
18. Relay unit
19. Starting circuit cut-off relay
20. Fuel pump relay
21. Neutral switch
22. ABS test coupler
23. ABS ECU (electronic control unit)
24. Front wheel sensor
25. Rear wheel sensor
26. Coupler 3 (wire harness–front cowling wire harness)
27. Diode
28. Brake light relay
29. Rear brake light switch
30. License plate light
31. Taillight assembly
32. Tail/brake light
33. Rear left turn signal light
34. Rear right turn signal light
35. Sidestand switch
36. Cylinders-#1/#4 ignition coil
37. Spark plug
38. Cylinders-#2/#3 ignition coil
39. Injector #4
40. Injector #3
41. Injector #2
42. Injector #1
43. Air induction system solenoid
44. ECU (engine control unit)
45. Crankshaft position sensor
46. Intake air temperature sensor
47. Coolant temperature sensor
48. Lean angle sensor
49. O_2 sensor
50. Cylinder identification sensor
51. Throttle position sensor
52. Intake air pressure sensor
53. Shift actuator motor
54. Shift actuator sensor
55. Clutch actuator sensor
56. Clutch actuator motor
57. MCU (motor control unit)
58. YCC-S test coupler
59. Coupler 4 (wire harness–front cowling wire harness)
60. Foot shift switch
61. YCC-S speed sensor
62. Gear position sensor
63. YCC-S control relay
64. Coupler 5 (wire harness–front cowling wire harness)
65. Headlight (on/off)/grip warmer relay
66. Coupler 6 (wire harness–front cowling wire harness)
67. Hazard lighting fuse
68. Signaling system fuse
69. Headlight fuse
70. Ignition fuse
71. Auxiliary DC jack fuse
72. Grip warmer control unit
73. Radiator fan motor relay
74. Left radiator fan motor fuse
75. Left radiator fan motor
76. Right radiator fan motor fuse
77. Right radiator fan motor
78. YCC-S motor control fuse
79. Turn signal/hazard relay
80. Left handlebar switch
81. Dimmer switch
82. Windshield position switch
83. Turn signal switch
84. Horn switch
85. Right handlebar switch
86. Front brake light switch
87. Engine stop switch
88. Start switch
89. Hazard switch
90. Accessory box solenoid
91. Meter assembly
92. Neutral indicator light
93. ABS warning light
94. Multi-function meter
95. Oil level warning light
96. Engine trouble warning light
97. Meter light
98. High beam indicator light
99. Right turn signal indicator light
100. Left turn signal indicator light
101. Thermistor
102. Hand shift switch
103. Hand shift lever switch (shift up)
104. Hand shift lever switch (shift down)
105. Hand shift select button
106. Hand shift select indicator light
107. Horn
108. Front left turn signal/position light
109. Front right turn signal/position light
110. Headlight assembly
111. Headlight
112. Headlight relay (dimmer)
113. Windshield drive unit
114. Left grip warmer
115. Right grip warmer
116. Auxiliary DC jack

ET3P66066

COLOR CODE

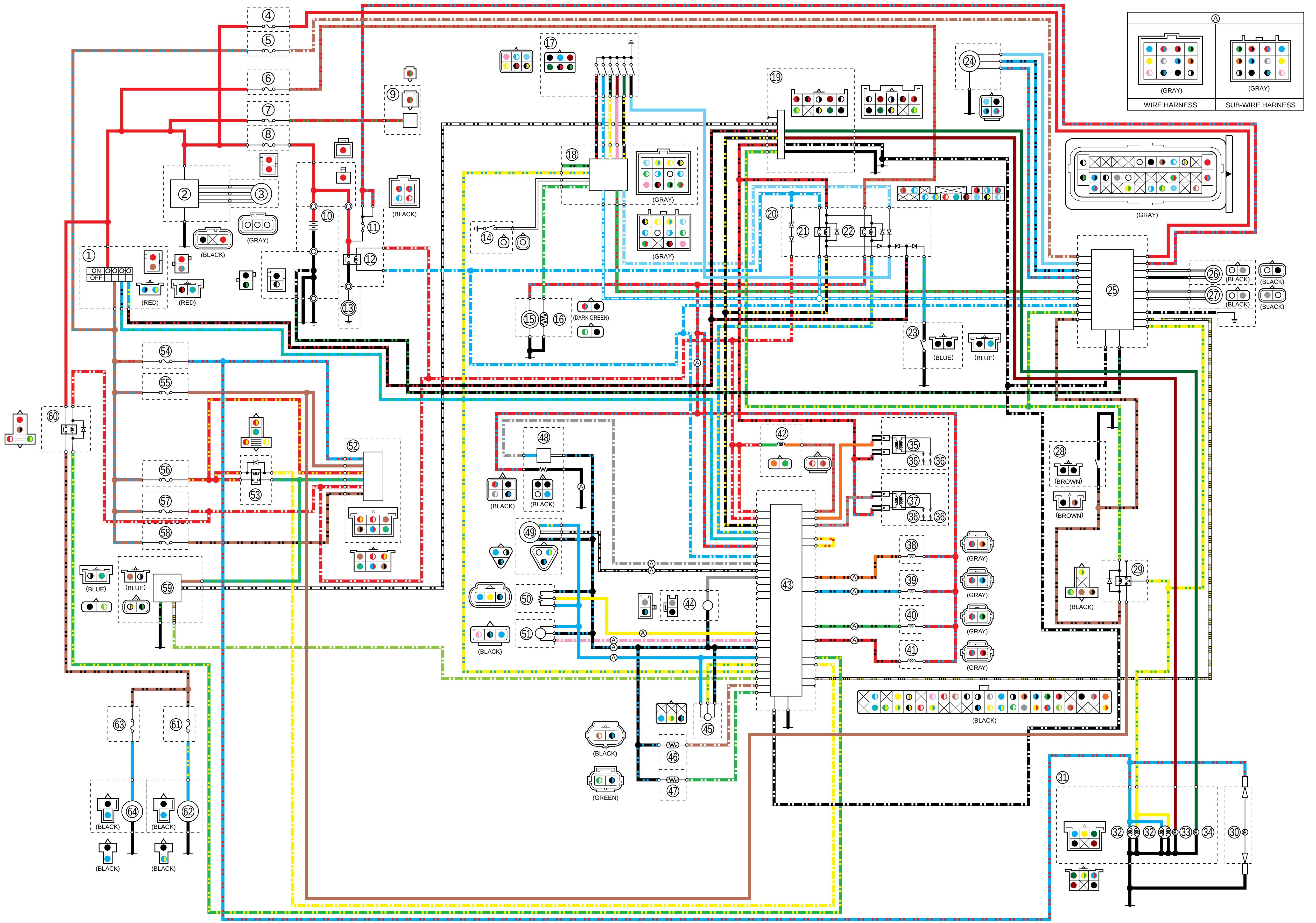
B	Black
Br	Brown
Ch	Chocolate
Dg	Dark green
G	Green
Gy	Gray
L	Blue
Lg	Light green
O	Orange
P	Pink
R	Red
Sb	Sky blue
W	White
Y	Yellow
B/G	Black/Green
B/L	Black/Blue
B/R	Black/Red
B/W	Black/White
B/Y	Black/Yellow
Br/B	Brown/Black
Br/G	Brown/Green
Br/L	Brown/Blue
Br/R	Brown/Red
Br/W	Brown/White
Br/Y	Brown/Yellow
G/B	Green/Black
G/L	Green/Blue
G/R	Green/Red
G/W	Green/White
G/Y	Green/Yellow
Gy/R	Gray/Red
Gy/W	Gray/White
L/B	Blue/Black
L/G	Blue/Green
L/R	Blue/Red
L/W	Blue/White
L/Y	Blue/Yellow
Lg/W	Light green/White
O/B	Orange/Black
O/G	Orange/Green
O/R	Orange/Red
O/W	Orange/White
P/W	Pink/White
R/B	Red/Black
R/G	Red/Green
R/L	Red/Blue
R/W	Red/White
R/Y	Red/Yellow
Sb/W	Sky blue/White
W/B	White/Black

W/L	White/Blue
W/Y	White/Yellow
Y/B	Yellow/Black
Y/G	Yellow/Green
Y/L	Yellow/Blue
Y/R	Yellow/Red
Y/W	Yellow/White

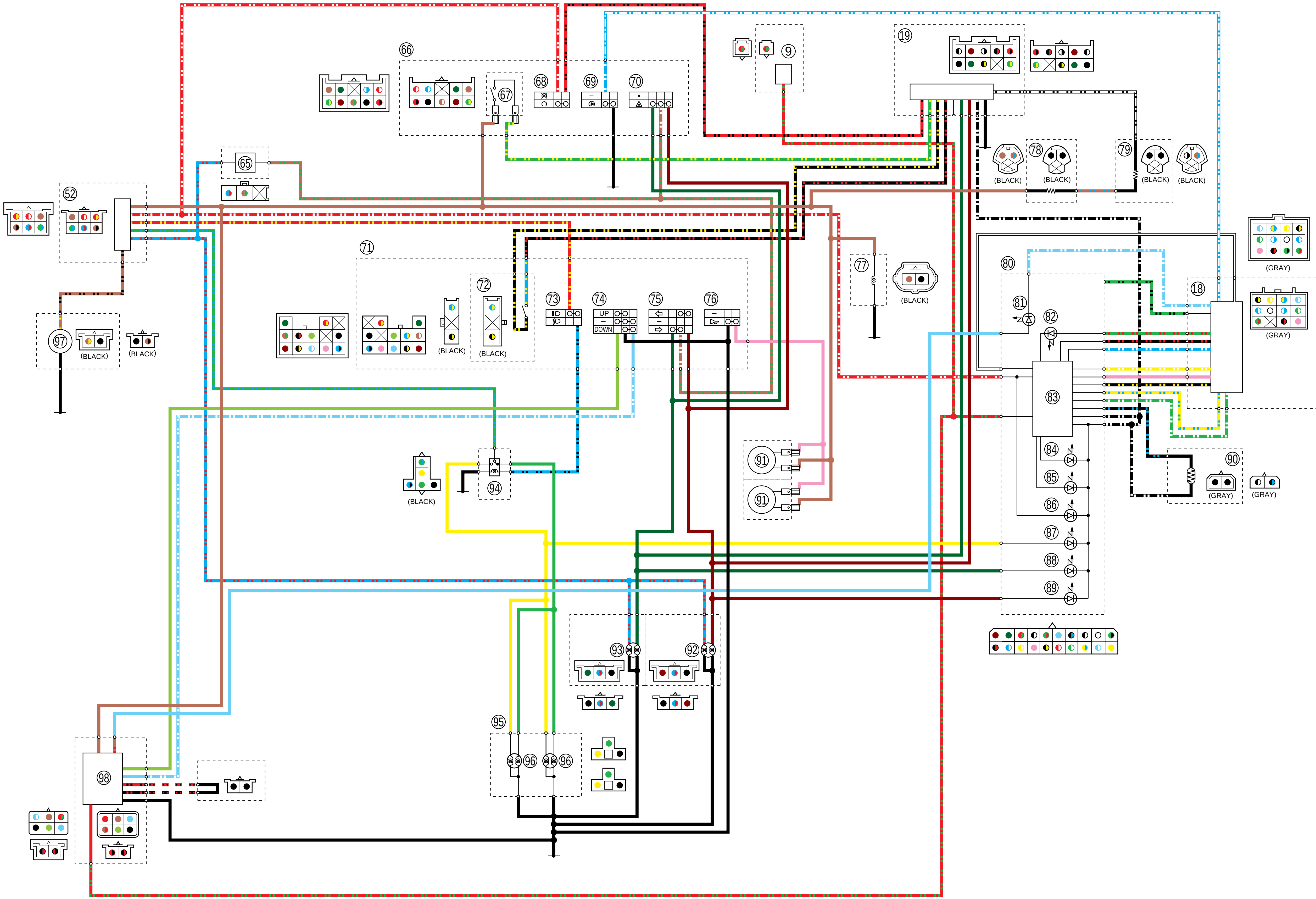
YAMAHA

YAMAHA MOTOR CO., LTD.
2500 SHINGAI IWATA SHIZUOKA JAPAN

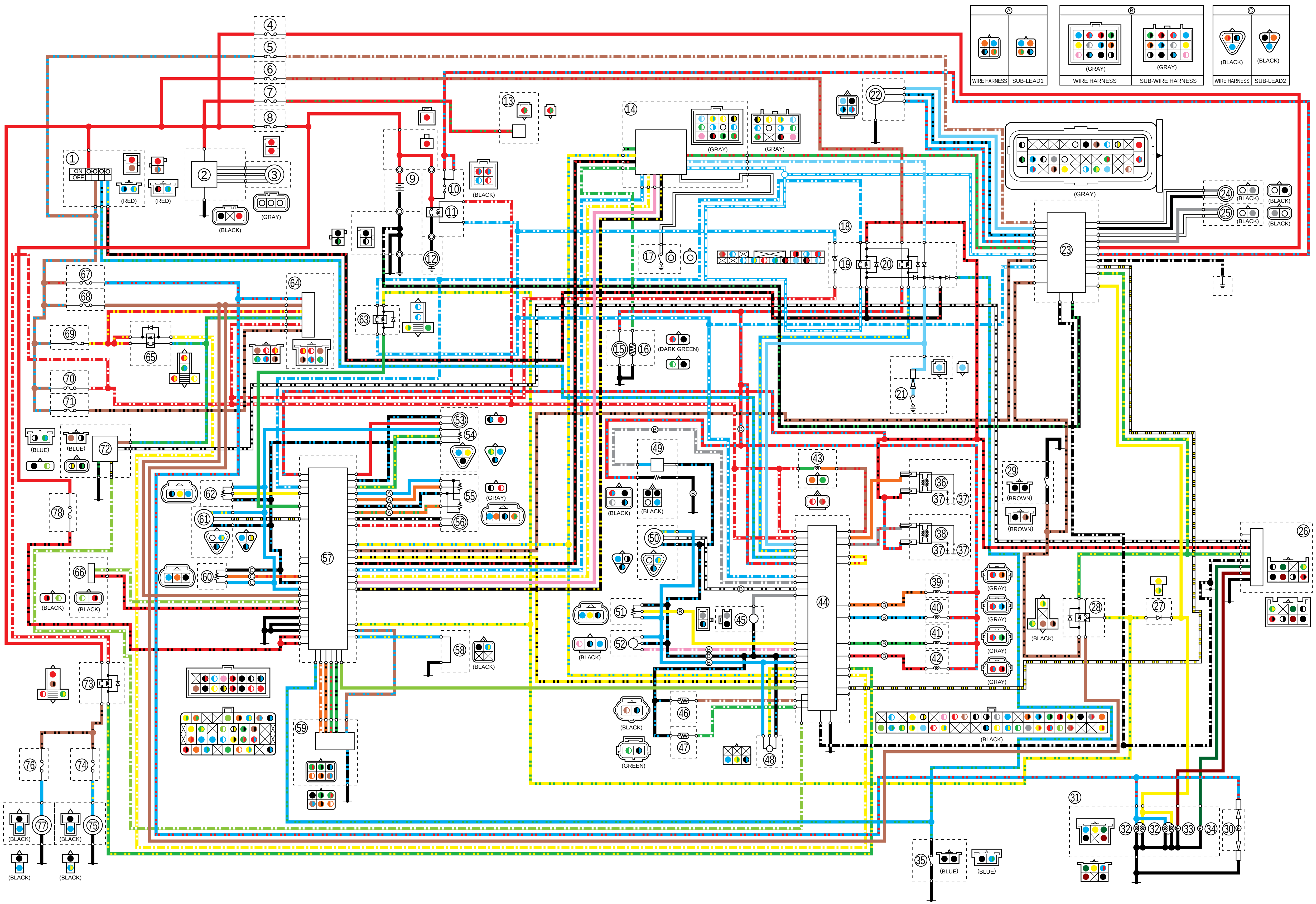
FJR13AY(C) 2009
WIRING DIAGRAM (1/2)



FJR13AY(C) 2009 WIRING DIAGRAM (2/2)
Front cowling wire harness



FJR13AEY(C) 2009
WIRING DIAGRAM (1/2)



FJR13AEY(C) 2009 WIRING DIAGRAM (2/2)
Front cowling wire harness

